Behind the Scenes...

Foundry Practice

Over at the Iron and Steel show we picked up a special secret hint for all you good people who make or use castings and have the problem of preparing the surface. We sneaked into the American Brake Shoe booth early one afternoon and caught Jack Houston of the Electro Alloys division with a big gob of wallpaper cleaner in his hands. Gumshoeing carefully behind him, we noted that he was using it to clean the castings. Now we had never before seen this particular application of wallpaper cleaner in his hands. Gumshoeing of a foundry is accustomed to sterner stuff, like sand and grit blasting, chipping hammers, etc. Then, too, there aren't too many customers who want their castings free of finger marks. However, if you happen to need finger-mark-free castings, try some of Jack's wallpaper cleaner for guaranteed results.

No Noise, No Pix

Despite the fact that there was a hot pennant fight on in the American League, and all the games were both broadcast and televised, there wasn't a radio or television set in any booth at the Iron & Steel show. We haven't yet figured out if this was because there was so much interest in the serious business of the show that nobody was interested in the bigger things of life, or just that nobody ever thought of it.

New Advt.

Browsing around among our advertisers, an occupation which we like very much to follow on account of all the new things we learn, we found a new and different one a couple of weeks ago. First time, we believe, that any photographer has displayed his wares in STEEL, because that's what Dorsey & Peters, of Houston, Tex., is advertising. Commercial photography, as paid advertising, is new and different, so chalk up a first for those Texans!

Yes, We Have

Our Readers Service Dept. reports that the 16-page section on steel prices is about the hottest thing which has come down the asphalt in many a long day. If you would like more copies of the "Guide to the Steel Industry's New Pricing System", you can purchase same through Readers Service for the modest sum of 25c each for the first ten copies, and a dime apiece for all over ten. Also, we have been asked by the RSD to remind you that the tool steel series, which wound up last Monday, will be available shortly in book form, at $1, and advance orders are now being taken for delivery in about two weeks.

Words, Just Words

After our expounding on the pronunciation of the word "psoloquoise" a few issues back, we received communication from S. M. Goodrich of American Steel Foundries, who asks us to pronounce "ghoti". For the benefit of you readers whose knowledge of English is limited, and who didn't know the first word was pronounced "circus" and the second "fish", let us say that it is all very simple. To get "fish", for example, you pronounce the gh like the gh in enough, the o like the o in women, ti like the ti in option. More horribler examples of the awful English language probably could be worked up. In fact, we'll be glad to print any you folks think are worthy of comment!

Poetry Corner

Been a while since we broke out into poetry in this austere colyume, but the limerick we cribbed from Typo Graphic (where Ed Stuart cribbed it from we don't know) makes it imperative that we donate a bit of space to the muse:

The stork is one of the mystics
And inhabits a number of districts.
It doesn't yield plumes
Or sing any tunes,
But helps out with vital statistics.

We also read this one recently:

Having put too much food within her,
Nellie died in the midst of dinner.
Economy minded Uncle Jake,
Ate the rest of Nellie's steak.

So much for the muse. After all she's been, she'll never be the same again after those two attacks above.

Shrdlu

(Editorial Index—page 55)

STEEL

Vol. 123—No. 15 October 11, 1948

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NEXT WEEK . . .

Preview of National Metal Congress and Exposition

Greater Forming Efficiency Provided by New Process

Shot Quality—How it Affects Fatigue Life

Tonnage Oxygen Aids in Increasing Steel Output

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 123, NO. 15 OCTOBER 11, 1948

NEWS

TECHNICAL

MARKETS

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October 11, 1948

We're Too Bashful

When the Marshall plan was proposed, debate ensued as to how much control our government should exercise over the manner in which the recipient nations were to employ our aid. Some persons contended that if we put up our money, we should have something to say about how it was spent. Others believed in avoiding dictation of policies to foreign governments for fear we would be charged with imperialism.

In drafting legislation authorizing the European Recovery Program, Congress adopted the latter viewpoint. As a result, Paul Hoffman's Economic Cooperation Administration leans over backwards in its hesitancy to even hint to the recipient nations what they should do with their ECA dollars. The 16 countries are free to initiate their own programs.

According to A. G. Bryant, president of the National Machine Tool Builders Association, and others who have visited the recipient countries recently, our policy of refusing to suggest how our money shall be spent is encouraging European politicians to propose programs which have a popular appeal but which fall short of the real objective of ERP—which is to help each nation to get onto a sound economic footing.

With due allowance for the fact that relief had to take precedence over recovery in the early stages of ERP, there is evidence of a disconcerting lack of enthusiasm on the part of recipient government officials for spending ECA funds for machines and equipment that are essential to rapid economic recovery. Year-old orders for American machine tools are gathering dust in European government files while ECA funds are being spent for American tooth paste, tobacco and other not-too-essential items.

Another incongruous situation is the clamor on the part of Europe for American agricultural implements, mining machinery, cars and locomotives. These are in short supply in the United States. On the other hand, the American machine tool industry is operating at only 50 per cent of capacity. Its machines, available for prompt delivery to European nations, would enable them to manufacture their own machinery, thus easing the pressure on the machines we need at home.

Our basic ERP policies need re-examination for two good reasons: More effective recovery abroad and a lesser strain upon our domestic economy.

* * *

DOLING OUT THE STEEL: American Iron & Steel Institute's report of finished steel shipments in the first half of 1948 shows that several consuming groups which were in dire need of more steel actually received larger shares in that period than during the full year of 1947.

Among these favored recipients was the oil and gas industry. Shipments to it of 2 million tons of steel for pipelines, well drilling and other needs represented 6.2 per cent of total shipments as compared with 5 per cent of the total for all of 1947. First half shipments to railroads, manufacturers of household appliances, the construction industry and the automotive industry were from one to six tenths of a per cent above the corresponding percentages for the whole preceding year.

Percentagewise these increases seem almost insignificant, yet the more liberal allotments have eased some critical situations appreciably. The distribution reflects the joint effort of in-

(OVER)

dustry and of the voluntary allocation system of the government to channel a portion of available steel to hardship cases.

Another indication of industry's desire to use discretion in distributing steel comes from the 26th annual convention of the American Institute of Steel Construction at Quebec, where President T. R. Mullen urged steel construction executives to establish their own individual allocation and priority systems to guarantee steel supplies to essential construction. —pp. 64, 69

* * *

DISLIKE MILL PRICING: Two Steel company executives whose plants are so located that the companies are not adversely affected by the present mill pricing system have come out strongly for a return to the multiple basing point system.

Frank Purnell, president of Youngstown Sheet & Tube Co., believes that the outlawing of the basing point system is jeopardizing the government's national defense plan. He points out that the government strongly advocates a dispersal of major industries. The effect of outlawing basing points, he contends, is to draw steel plants and the plants of steel consumers closer together in a few communities.

Joseph L. Block, vice president of Inland Steel Co., says that the inflexible mill pricing leaves some territories as monopolies to single producers and that in many other localities buyers will be at the mercy of a handful of sellers.

Meanwhile the Capehart committee is preparing for hearings beginning Nov. 9 in Washington to hear from steel buyers how mill pricing is affecting their businesses. —pp. 64, 65, 66

* * *

MOTORDOM'S BIG YEAR: Last January automobile manufacturers estimated they would turn out 5,500,000 passenger cars and trucks in 1948. Shortly thereafter came a succession of interruptions which made it appear doubtful this goal could be attained.

In spite of these discouraging setbacks, output for the first nine months has exceeded 4,000,000. The sharp upturn in assemblies during the past two weeks has brought out hopes that October may be the high production month of the year. If no serious new difficulties arise, it is possible that output in the fourth quarter may reach 1,500,000, which would bring the year's total to the original estimate.

Considering the problems of the year, this would be a noteworthy achievement. The industry's peak year was 1929 when more than 5,600,000 vehicles were assembled. Current models go out from factory with more accessories than did those of 1929. Perhaps 5,500,000 vehicles in 1948 actually represent more production than did 5,600,000 in 1929. —p. 77

* * *

CHALLENGE FOR ALLOYS: Progress in military aircraft seems to be settling down to a race between the development of turbo-jet engines of ever increasing power and the creation of alloys which will stand up at the high temperatures at which these new engines operate.

Turbo-jets, which already have made conventional gasoline-powered reciprocating engines practically obsolete for military planes, are limited in power by present high temperature alloys which permit top operating temperatures of only 1300 to 1500° F. However, titanium-cobalt turbine blades produced by the powder metallurgy process are showing excellent results in the 2400° F range and experience with hollow, water-cooled blades of S-816 alloy and Inconel X indicates that operation at 3500° F is practical.

Current trends in jet engine research are opening up important new responsibilities and opportunities for metallurgists. —p. 66

* * *

SHIFT BACK TO COAL: Papers presented at the annual meeting of the Association of Iron & Steel Engineers reveal an impressive array of improvements in equipment and some significant changes in practice. Among the latter is the steel industry's postwar shift from fuel oil to coal or fuels produced from coal.

As the petroleum industry turns more and more to catalytic cracking, each barrel of crude yields a larger proportion of gasoline, kerosene and distillate oils and a smaller proportion of residual oils. This is forcing heavy industry back into the use of coal.

Steelmakers are meeting this situation by using blast furnace gas to underfire coke ovens and soaking pits. Coke oven gas thus liberated is used in open hearths. Boilers are being fired with powdered coal and coke breeze to replace blast furnace gas. Further shifts, involving greater use of manufactured gas, are contemplated. —p. 114

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

ALLOCATIONS— Steel industry representatives have approved plans to extend three voluntary allocation programs covering national defense needs beyond Feb. 28, expiration date for Public Law 395 (p. 63). Most proposed new programs received a cold shoulder although one, providing steel for shipbuilding, was approved. Little hope is held for programs not yet approved, due to the time element.

WHO GETS STEEL?— Statistics on distribution of steel products show that the oil and gas industries, striving to meet unprecedented postwar demands, are faring well in receipts of steel. During the first half of 1948, such consumers received two-thirds as much material as they obtained during all of 1947 (p. 63). Steel shipment figures also show that a larger percentage of total steel output is going into cold-rolled sheet and strip and into plates than a year ago. Senator Martin's small business subcommittee is anticipating some interesting figures from its questionnaire on steel distribution by leading companies in 1940 and 1947; committee hopes to have these data in hand within the next 10 days (p. 64).

NEW FREIGHT BOOST— Railroads have petitioned Interstate Commerce Commission for an additional 8 per cent increase in freight rates, affecting practically all commodities (p. 67). Since 1939, freight rates have advanced 40.8 per cent, but the carriers say their costs have gone up 75 per cent.

GRAY MARKET— Sales of scarce steel products at premium prices continue active (p. 68). Some interests believe the steel gray market has been given a shot in the arm by the voluntary allocations program, and point out that plates now figure substantially in gray market transactions, possibly running second to sheets in volume. About a third of total plate production is being channeled to preferred programs.

ERP REQUIREMENTS— United States manufacturers of capital goods will be asked to supply between $500 million and $1 billion worth of goods for the European Recovery Program during the first half of 1949, or about half of the total required for the program (p. 74). The other half will be obtained in trades among the participating countries. Largest needs will be for equipment for oil drilling, refining and storage, steel plants, mining, and the textile industry.

PHANTOM ORDERS—Standby orders for 100,000 machine tools have been placed with 290 builders, with production to start only in case of emergency or actual war. (p.73) Purpose of the ghost orders is to eliminate delay in producing the essentials of war should such production become necessary. If the machine tool phantom order program is successful, it will be extended to other industries.

SAFETY— Every four minutes, one worker is killed or crippled and 15 others are injured in industrial accidents. This fact was highlighted at the President's conference on industrial safety (p. 70) in Washington. Emphasizing that accident prevention costs less than payments for damages and lost production, the conference launched a technical study of accidents, their causes and prevention.

HERE AND THERE IN INDUSTRY— Auto builders had passed the 4,000,000 mark at the beginning of October (p. 77), hope to assemble 5.5 million cars and trucks during 1948 . . . . Federal Trade Commission's 24-year-old Pittsburgh Plus case against U. S. Steel finally has been settled (p. 65) . . . Shipbuilding is proceeding at three times the rate of last year (p. 67) . . . . United States and Great Britain have reached an agreement under which each can buy 500,000 tons of scrap in bizonal Germany immediately (p. 67) . . . . Outlawing of the basing point system of pricing may jeopardize national defense plans, says a leading steelmaker (p. 65) . . . Yale & Towne starts production in its new specialties plant seven months after plans were completed (p. 80) . . . Clyde Porcelain Steel Corp. (p. 80) is expanding plant capacity 70 per cent . . . Steel construction men are advised to set up their own priority system to curb nonessential use of steel in building (p. 69).

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Reckoned in terms of transportation, Ryerson steel stocks and steel experience span the gap between plodding percheron and flashing jet plane.

On the hoofs of thousands of horses, Ryerson iron clattered along the cobbled streets of yesterday. Now, Ryerson aircraft alloys streak through the sub-stratosphere in the high speed planes of the Air Age.

This century of service to transportation and allied industries illustrates how Ryerson has kept pace with progress. Ryerson stocks of carbon, alloy and stainless steel—continually changing with the times—always meet the specialized requirements of every major industrial field.

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Steel For Defense Assured

Industry representatives ready to continue shipments, even if allocations law expires. Turn cold shoulder on eight proposed new civilian programs

VOLUNTARY allocations of steel to three approved programs closely associated with national defense will be continued after the expiration of Public Law 395 next Feb. 28.

This was indicated by steel industry representatives meeting with Secretary of Commerce Charles Sawyer last week. The steel men said that in the absence of an extension of the law they would comply with requests by the Commerce Department to continue for six months shipments of steel for military requirements, the Atomic Energy Commission and the National Advisory Committee for Aeronautics. These programs currently are taking 129,730 tons of steel monthly.

Reject New Programs — The steel men turned a cold shoulder on eight of nine proposed new programs. The one plan accepted will provide 10,000 tons of steel monthly during January and February for shipbuilding.

Plans rejected include the following: Domestic, farm and home fuel oil storage tanks, 12,000 tons monthly during January and February; steel baseboard radiation, 850 tons monthly; steel doors and bucks, 4100 tons monthly; pressed steel plumbing ware, 5300 tons monthly.

Action on four other plans was postponed pending further study: Terminal and bulk oil storage tanks, 16,000 tons monthly; maintenance and operation of bituminous coal mines, 31,000 tons monthly; mining machinery, 47,800 tons monthly; 22-inch pipeline for East Tennessee natural gas line, 25,000 tons monthly.

Heating Allocations Larger — Request for 2500 tons of steel sheet monthly for the warm air heating program was approved; former allocation was 29,170 tons monthly.

The steel men rejected a request for an addition of 5000 tons monthly for construction and repair of barges and towing vessels.

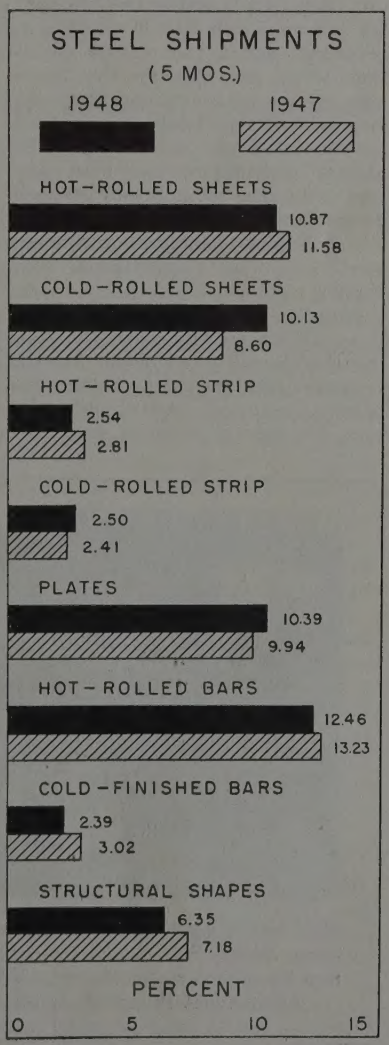
Nonferrous Program Coming—Secretary Sawyer will discuss plans for voluntary allocations for stockpiling copper on Oct. 12; lead and bismuth on Oct. 19; zinc and cadmium on Oct. 20.

Lead Time Must Be Given

STEEL not ordered under any one month's authorization under voluntary allocation programs cannot be added to authorizations for ensuing months.

This reminder is being sent to participants in six new voluntary programs by the Office of Industry Co-operation, which points out that to fill an order for most standard steel products a steel company must have it 45 to 60 days prior to the first of the month in which mill shipment is to be made. On some specialty products this lead time may be considerably longer.

The OIC issued the reminder because some allocation participants may not have had time to place all of the October orders for which they had OIC authorizations. The OIC explained it was impossible for it to issue certification authority to them in sufficient time to meet lead time for October. However, orders accepted for October shipment can be certified to the extent that they include steel products to be used under the voluntary allocations plans. Any tonnage that could not be placed with the mills for that month cannot be added to OIC certifications for later months.



Production Shifts Reflected

SHIFTS in steel product output increased percentages of plates, cold-rolled sheets and cold-rolled strip in the first five months of 1948 over those of the corresponding period of 1947.

Meanwhile, percentages of hot-rolled sheets, hot-rolled strip, hot-rolled bars, cold-finished bars, and structural shapes decreased, according to figures from the American Iron & Steel Institute, New York.

Finished steel distributed in the first five months of 1948 totaled 26,852,622 net tons, compared with 25,884,885 tons in the like period of 1947.

Comparisons of product distribution in the first five months follow:

Product		Tonnage	Per Cent of Total Distribution
Plates	(1948)	2,789,267	10.39
	(1947)	2,571,988	9.94
C.R. Sheets	(1948)	2,719,545	10.13
	(1947)	2,226,529	8.60
C.R. Strip	(1948)	671,621	2.50
	(1947)	623,847	2.41
H.R. Sheets	(1948)	2,919,007	10.87
	(1947)	2,996,428	11.58
H.R. Strip	(1948)	683,333	2.54
	(1947)	727,585	2.81
H.R. Bars	(1948)	3,347,088	12.46
	(1947)	3,425,852	13.23
C.F. Bars	(1948)	641,506	2.39
	(1947)	781,693	3.02
Struc. Shapes	(1948)	1,704,610	6.35
	(1947)	1,859,768	7.18

Steel Shipments Show Increase

THE OIL AND GAS industry, striving to meet an unprecedented postwar demand, has been aided by increased receipts of steel.

In receiving nearly two-thirds as

much tonnage in the first half of 1948 as in all of 1947, that industry, according to the American Iron & Steel Institute, took in slightly more than 2 million tons for pipelines and other construction and for well drilling.

The tonnage is equal to 6.2 per cent of the steel industry's reported shipments of 32,256,000 tons.

In the full year of 1947 the oil and gas industry received slightly more than 3,150,000 tons of steel, equal to 5 per cent of total shipments of 63,057,000 tons.

Automobiles Lead—Although several other principal industries are also sharing in the 1948 increase in finished steel shipments, which appear likely to be higher this year than ever before in war or peace, the automotive industry continues to hold first place among industrial consumers of steel. In the first half of 1948 more than 4,925,000 tons of steel went to the automotive field, excluding tractor firms. That was equal to 15.3 per cent of total shipments.

The construction industry, including contractors' products and maintenance materials but excluding oil and gas industry construction, received in the first half of 1948 more than 3,700,000 tons of steel, equivalent to 11.5 per cent of total shipments.

More To Railroads—Rail transportation in the first half of 1948 took in 2,535,000 tons of steel, equal to 7.9 per cent of total steel shipments.

A pronounced gain was made in shipments to manufacturers of household appliances, their receipts totaling in excess of 973,000 tons, equal to 3 per cent of total shipments in the first half of 1948.

Jobbers, dealers and distributors, exclusive of oil and gas, also shared in the increased tonnage. They took in about 4,850,000 tons or 15.1 per cent of all the steel shipped in the the first half of 1948.

Shipbuilding Increased—Shipments to the shipbuilding and marine equipment field increased sharply in the first half of 1948, although the tonnage involved was comparatively small.

Percentagewise there was little change in shipments to the following classifications in the first half of 1948: Containers, 2,537,300 tons; mining, quarrying, lumbering, 158,300 tons; machinery, tools and industrial equipment, including tractors, 1,487,000 tons; agriculture, 746,900 tons; electrical machinery, 793,800 tons; and domestic and commercial equipment, other than appliances, utensils and cutlery, 874,200 tons.

Steel Distribution Study Pushed

Senate Small Business Subcommittee seeking to determine extent to which normal distribution has been disrupted. Federal Trade Commission to tabulate data

INFORMATION obtained in response to the steel distribution questionnaire sent out in September to 15 selected steel producers comprising more than 80 per cent of the industry's capacity will be put to wide use by the Martin Steel Subcommittee of the Senate Small Business Committee which is conducting the inquiry.

The questionnaire grew out of thousands of complaints from small consumers unable to get steel, and particularly out of claims by many consumers that the steel industry's distribution system was not geared up to treat everybody with equal consideration.

Distribution Studied—In a press conference, Chairman Edward Martin (Rep., Pa.) stated frankly that his subcommittee had in mind congressional action "to remedy conditions which may threaten the American system of free, competitive enterprise." In particular, he wanted to determine the extent to which normal distribution has been disrupted by the withdrawal of steel companies from geographic areas, and by increased integration through steel companies' acquisition of consuming plants.

Certainly the subcommittee is not going to try to whitewash the steel industry should it conclude that the industry has practiced unfair distribution policies. As a matter of fact, the subcommittee at first tried to get the Federal Trade Commission to conduct the investigation, but the FTC demurred on the ground that it had no funds to finance such an effort. Even so, the FTC will make the tabulations from steel company questionnaires and assist the subcommittee in reaching its conclusions.

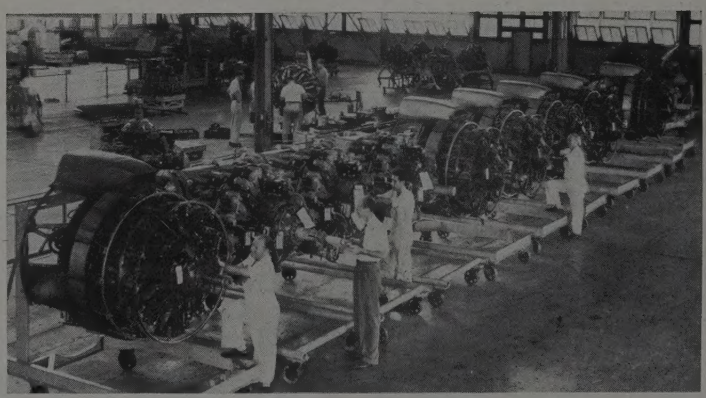
Will Collect Data—The subcommittee will not be satisfied with explanations that some of the smaller companies questionnaired lack accounting facilities for furnishing the distribution data desired. If there are such cases, the subcommittee stands ready to send government accountants to look over the books.

The questionnaire (see STEEL, Sept. 20, p. 69) calls for information as to the distribution of those products the subcommittee found in shortest supply—sheets, strip, bars, pipe and tubing. To give the subcommittee a better picture of the shipments by steel producers to affiliated companies, structural shapes and plates were included in the form covering such shipments. The breakdown for shipments to warehouses includes all the above products, also wire and wire products.

The subcommittee expects to have most of the replies by Oct. 20.

Capehart Hearings Begin Nov. 9

SEN. HOMER E. CAPEHART (R., Ind.) at a luncheon meeting of the



RECONDITIONING: At Pan American World Airways new overhaul base, Miami, Fla., workers put final touches on huge Clipper engines that have been reconditioned. When in full operation the airline's giant maintenance shops will employ more than 3000 skilled craftsmen

Economic Club of Detroit last week announced that public hearings before the Trade Policies Committee, of which he is chairman, will be held beginning Nov. 9 in Washington.

The senator, speaking on "What the Cement Case Decision Means to American Industry," told members of the club that the 5 members of the Federal Trade Commission had disagreed in their testimony before the Senate Committee as to what was now the law with respect to freight absorption and uniform delivered prices, and even greater disagreement prevailed among the staff of the commission.

He said that he considered it the primary duty of the committee to clarify the law so that businessmen who wish to be law abiding citizens might know what was required of them to comply with the law.

The senator said the committee would not concern itself with conspired prices or Sherman Anti-trust law violations. He stated that the opening sessions of the public hearings would be confined largely to testimony of witnesses from the Federal Trade Commission, and representative buyers and sellers of steel, sugar and cement. He said he was anxious to hear from steel buyers, since that was one of the first industries to change to f.o.b. mill pricing, and he wanted to learn the effect of this change on steel buyers.

Pittsburgh Plus Case Ended

UNITED States Steel Corp. last week consented to a decree of affirmance entered by the United States Court of Appeals for the Third District, Philadelphia, in the basing point case begun by the Federal Trade Commission in 1921, and generally known as the Pittsburgh Plus case.

U. S. Steel said that 24 years ago the FTC order, now affirmed, was entered against the company and certain of its subsidiaries in a proceeding involving the use then of the so-called Pittsburgh Plus method of selling steel.

In 1947 a new case was begun by the FTC against approximately 100 companies in the steel industry, including U. S. Steel, involving use of the so-called multiple basing point method of selling steel.

Institution of this new proceeding, according to the company, should ultimately determine by what competitive methods steel can be sold by members of the steel industry. Because of this and the further fact that in July, 1948, U. S. Steel and its subsidiaries adopted the practice of selling steel on the basis of f.o.b. mill prices, U. S. Steel has consented to the decree of affirmance, believing that the court should not be called upon to review a volumnious record taken at hearings over 25 years ago for the purpose of deciding a question which has become academic.

Blast furnaces and coke plant at Campbell Works of Youngstown Sheet & Tube Co.

Sees Defense Plan Jeopardized

OUTLAWING of the basing point system of selling steel is jeopardizing the government's national defense plan, in the opinion of Frank Purnell, president, Youngstown Sheet & Tube Co., Youngstown.

Speaking at the "open house" held by the company at its Youngstown plants last week, Mr. Purnell pointed out the government's latest plan is to disperse major industries widely, but under the f.o.b. system of selling steel the tendency is for steel plants and steel consumers to be drawn closer together in a few communities.

Will Disrupt Industry — He contended that the country will not feel full effects of the change in pricing soon, but eventually it will disrupt all industry unless there is a change. He said steel companies are unable to afford to build new plants nearer customers because of high costs of new construction, but that will change in the future. Steel consumers are unable to move nearer their suppliers now because of the labor shortages and housing shortages in major steel districts.

Mr. Purnell said Youngstown Sheet & Tube has about 35 per cent of its capacity in the Chicago district and 65 per cent in Youngstown. Eventually the company plans to make it 50-50 but is unable to do so yet because of high costs of construction. It currently is building a continuous seamless pipe mill in Indiana Harbor and is making other changes. It is enlarging one of its blast furnaces and had planned a large addition to its coke plant. This latter has been temporarily postponed.

The steel executive said he feels the Chicago district will be comparatively little affected by the change in the pricing system because of its huge steel consumption.

Labor Shortage — Sheet & Tube's employment in Youngstown has jumped to 14,500, with an annual payroll of about $55 million. Currently the company is feeling a serious labor shortage and about 32 per cent of its work is performed on overtime.

Mr. Purnell revealed over $2 million is being spent on experiments to beneficiate taconite. He said 3 tons of taconite are needed to produce 1 ton of iron concentrate testing 65 per cent iron. The company he said, is concerned about its iron supplies, but it is "as well off as most other producers."

He contended people are "kidding themselves" about high steel profits, stating depreciation charges are too low, thus earnings are only an illusion. Building costs are three to four times those of the days when most steel mills were built. For example, Campbell Works coke ovens cost about $35,000 each, but now would cost $140,000 to $155,000 to replace. His company's composite depreciation rate is only 4 per cent.

"That means," he said, "it takes 25 years to get your money back."

Hits Allocations, Pricing Policy

BEST interests of the public would be served by a return to a price system that provides industry with com-

petitive rights and by restriction of governmental power over allocation of scarce materials in peacetime, Joseph L. Block, vice president, Inland Steel Co., Chicago, said last week speaking at a meeting of the Farm Equipment Institute at French Lick Springs, Ind.

Mr. Block said he is opposed to the new f.o.b. mill pricing system even though his own company has everything to gain and nothing to lose under it because of a more favorable ratio of demand to supply in its home area. He explained that the inflexible mill price in the industry leaves some territories as monopolies to single producers and in many others buyers are at the mercy of but a handful of sellers. Thus, competition not only is not enhanced but is actually stifled.

Strengthen Competition—Congress should strive, in Mr. Block's opinion, not for some fantastic utopia but rather to strengthen competition under existing conditions and to make the best possible use of the producing facilities already built in this country. A mill price with the right to compete is the answer, he stated.

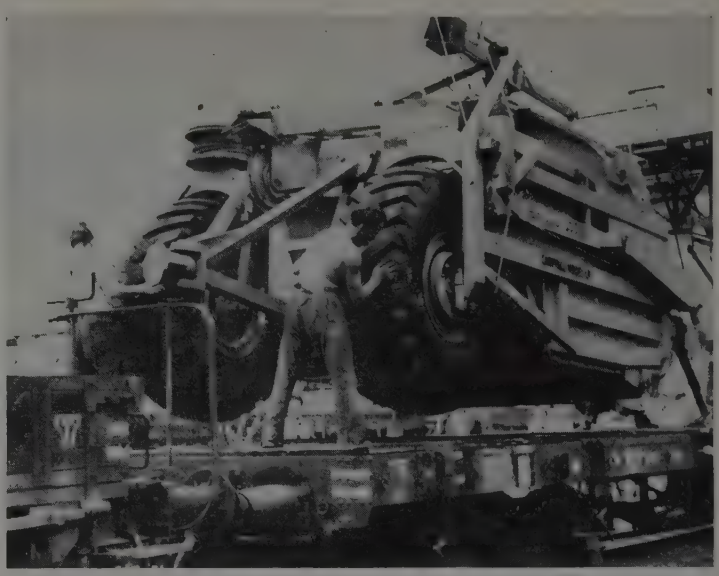
In regard to allocations, Mr. Block said he does not believe Congress should authorize, by either voluntary or involuntary methods, allocation of any materials in peacetime save those essential for national defense, discharge of foreign commitments and relief in a great national emergency. Steps beyond this, he believes, constitute playing recklessly with our democratic form of government.

Certain programs such as transportation, agriculture and housing received first attention under the present allocations programs, he said, since they mesh with the common conception of essential industries. Now, however, the administrators of the programs are faced with a multitude of appeals from all directions and are finding it difficult to turn down any group which properly adheres to the procedural routines that have been established.

Heads Foundry Advisory Group

AT THE organizational meeting of the Munitions Board's Foundry Industry Advisory Committee Sept. 29, F. G. Steinebach, editor, *The Foundry,* and vice president, the Penton Publishing Co., was elected chairman.

Scope of the committee's coverage was discussed at length and nine subcommittees were appointed in charge of the following breakdowns: Foundry equipment, foundry supplies, gray iron castings, malleable castings, steel castings, brass and bronze castings, aluminum and magnesium castings, cast iron pipe and foundry technical problems.



SWISS BEST CUSTOMERS: American machinery is shown being unloaded at Basel, Switzerland, for shipment to an airport expansion project. Switzerland is America's best cash customer, buys twice as much from us as we buy from them. NEA photo

Jet Engine Research

NACA laboratory at Cleveland now given over entirely to work on jet and rocket engines

AS FAR as military aircraft are concerned, conventional gasoline-powered reciprocating-type engines are practically as obsolete as the horse and buggy, having given way to new, more powerful turbojet engines and thereby affecting many suppliers of materials and components. For commercial aircraft and cargo-carriers, the reciprocating type engine is expected to prevail for quite some time.

Cleveland's NACA research laboratory now is entirely given over to work on turbojets, propjets (turbojets with propellers) ramjets and rocket engines.

It appears likely that turbojets will be available with three times the power of present engines and that aircraft speeds in the supersonic range will be commonplace. Already, American rocket engines have been developed with twice the range of the famous German V-2, and turbojets have been greatly souped up through use of after-burners.

Power Factor — Turbojets are limited in power by present high temperature alloys which permit top operating temperatures of only 1300-1500° F and which means that only a quarter of the oxygen is consumed. Power can be increased 300 per cent by boosting the turbine inlet temperature from 1500° to 3000° F and at the same time increasing the pressure ratio from about 8 to 1 to 26 to 1.

Titanium-cobalt turbine blades produced by the powder metallurgy process and called "ceramals" already are showing excellent results in the 2400° F range. In addition, hollow blades of S-816 alloy and Inconel X with 24 fins for water cooling indicate that operation at around 3500° F is now practical. Research also indicates that water-cooled blades of SAE 4130 and 1015 steel now can be used at elevated temperatures. Supersonic compressors also show considerable promise for increasing pressure ratios without adding to engine bulk and weight.

Research now is being conducted with an eye toward reducing manufacturing tolerances and lowering costs. For instance, compressors are being designed with fewer fins to reduce machining time.

Washington Steel Output Up

ABOUT 1500 persons visited Washington Steel Corp.'s plant in Washington, Pa., Oct. 5 in an observance

of the company's year of operation.

Monthly output of stainless sheets and strip has been gradually increased throughout this period, currently averaging around 700 tons. Somewhat higher production levels are indicated through remainder of this year, according to T. S. Fitch, president. Company is in position to furnish stainless strip and sheets in gages down to .005 off its 36-inch Sendzimir mill.

Ask New Rate Boost

Railroads seek 8 per cent freight increase. Drop petition for coal, coke, ore advance

NEW freight rate increases of 8 per cent are asked by Class I railroads in a petition filed with the Interstate Commerce Commission Oct. 1. At the same time, the carriers withdrew a petition filed Aug. 26 for an increase in the rates on coal, coke and iron ore only. Hearings will open Nov. 30.

Under the new proposal, the carriers limit the increase asked on coal and coke to 30 cents a net ton (34 cents a gross ton), the same asked in the Aug. 26 petition or to 8 per cent, whichever is less.

The Aug. 26 petition asked an increase of 25 cents a ton on iron ore, except from mines to upper lake ports. The new petition asks a flat 8 per cent increase.

Practically all manufactured articles would take the full 8 per cent increase.

Supporting their petition, the railroads argued their costs have advanced 75 per cent since 1939 while freight rates have advanced only 40.8 per cent.

Carriers Grant Wage Increase

WAGE increase of 10 cents an hour has been granted by the nation's railroads to 175,000 operating personnel. The increase, to become effective Oct. 16, covers conductors, trainmen, yardmasters, yardmen and dining car employees represented by the Order of Railway Conductors and the Brotherhood of Railroad Trainmen. The unions had demanded an increase of 25 cents an hour.

U. S. Sues Railroads

ATTORNEY General Tom C. Clark has filed a complaint with the Interstate Commerce Commission to recover reparations from 496 railroads for alleged overcharges on the shipment of war materials. The complaint charges that the railroads charged the government at increased rates which were under suspension from May 15, 1943, to June 30, 1946, for government goods stored in transit at the Army's holding and reconsignment points.

Shipbuilding Triples '47 Figure

MORE than 1 million tons of shipping was on order or under construction in shipyards in the United States on Sept. 1, according to Shipbuilders Council of America.

Included in the total building program which is three times that under construction at the same time last year, are two 20,500 ton luxury liners for American Export Lines and 61 tankers aggregating 984,000 gross tons.

The two largest tankers are being built at Welding Shipyard, Norfolk, Va., for National Bulk Carriers, New York. They will measure 615 feet in length and have a deadweight tonnage of 30,000 tons. Fifty others are of the super tanker category, between 26,000 and 28,000 tons.

Not included in the council's report are the three passenger vessels for the American President Lines which were not contracted for at the time the report was compiled.

Coast Buyers Pessimistic

WHAT thoughts are going through the minds of West Coast steel buyers during the current cycle of confused prices, erratic supply trends and uncertain future demands?

Here are a few, culled from talks by speakers on steel at the Third Pacific-Intermountain Purchasing Agents Conference held recently in Los Angeles.

Shifts Seen—A. B. Tietjen, purchasing agent, Southwest Welding & Mfg. Co., Alhambra, Calif.: "As to the multiple basing point system change, it will take time to digest the ultimate effect. A shift in plant locations of many steel users may come. Some areas will eliminate water tonnage and throw additional burdens on railroads because differences in the two methods of shipments will be only slight. This is because on an f.o.b. mill basis the consumer pays freight from mill to tidewater in the East at from $10 to $11 per ton.

"The net result of the change seems to be increased costs for a greater percentage of steel users.

"Further increases in rail rates are almost sure to be granted. Hence we still have not seen the peak in steel prices."

Steel Supply—Farrel Smith, P. A., Marchant Calculating Co., Berkeley, Calif.: "It is not reasonable to believe that there will be more steel next year for companies like ours. Over-all production for the year 1948 will fall short of the peak year, 1944, by a maximum of 2 per cent.

"Bar mills are producing to capacity. If anything, due to diversion of basic raw materials for other steel types, bar stock production will drop.

"Despite the fact that Columbia's new mill at Pittsburg, Calif., will be producing soon and that Kaiser operations will continue to benefit the West, we cannot look for any more steel for the coming year because the voluntary allocation list has had six industries added recently. This vital industry allocation will cut deeply into less important manufacturing supply.

Reich Scrap Loosened

U. S., Britain reach agreement by which buyers in each nation may purchase 500,000 tons now

UNITED STATES and the United Kingdom have reached an agreement under which buyers in each country may purchase immediately 500,000 tons of iron and steel scrap from the bizonal area of Germany.

In addition, 225,000 tons of scrap were made available for other deficit countries, principally Italy, Belgium and Sweden. The prices will be uniform and established by the American and British Military Governors in Germany.

To Ship 2 Million Tons—Plans call for shipment of at least 2 million tons to western nations during the next 12 months. British steelmen, while expressing gratification that an agreement has been reached, were disappointed that the quantities for each country can not be even larger. The view in Washington was that this action would untangle red tape holding up offers from American importers for Bizonia scrap.

The agreement proposes establishment of an international committee to recommend allocations of iron and steel scrap available for export from western Europe, to be made up of representatives of the 16 ECA countries and the United States. The agreement also aims at halting the charges and countercharges coming from dealers in the United States that those in Great Britain were using unfair buying practices.

The State Department emphasized that shipments from Germany will not affect adversely the plans to increase steel output of the Ruhr. Scrap necessary for this program will be reserved. Most of the material to be exported will be rubble scrap.

Gray Market Continues Active

Sheets still in most demand, command highest premiums. Plates move up to No. 2 spot, as result of heavy allocations. Pipe also offered and bought in irregular market

SHARP competition for tonnage among metalworking companies is sustaining a fairly active gray market in steel.

Sheets continue the No. 1 item in the irregular transactions and command the largest premiums.

Plates have moved up into second place. About a third of plate production is being allocated under the 10 approved voluntary programs. Nonpreferred plate users are scrambling to fill their requirements out of the remaining two-thirds.

Pipe and tubing also figures in an increasing number of gray market deals.

Prices Vary Widely — Prices on gray market offerings vary considerably. In the East and Midwest, home of the major producers, sheets are obtainable at anywhere from 11 to 14 cents a pound, hot or cold-rolled. Galvanized sheets generally bring 16 to 18 cents.

Premiums on plates are substantially lower, with the bulk of gray market tonnage going at 7 to 10 cents a pound. The substantial difference in quotations on sheets and plates, both about equally scarce, is explained by the fact that there are more small shops competing for sheets. Generally, plate consumers are fairly large and more often have close mill connections.

In the South and West, gray market prices run considerably higher. In Dallas hot-rolled sheets are selling at 16 cents a pound while galvanized sheets bring 20 cents.

Plates are being offered in Seattle at prices ranging from 12 to 15 cents a pound for prime material. Shipyard surplus plates from the eastern seaboard are offered at 7 cents f.o.b., but these are odd sizes.

Galvanized sheets can be bought in the Seattle gray market at 16½ cents.

Detailed quotations on oil well casing, drill and line pipe are difficult to obtain although reports are numerous of transactions in these commodities at premium prices.

Sellers Guarantee Delivery—A new wrinkle in gray market operations is noted at Chicago where sellers offer to post performance bonds for delivery of large steel tonnages at above market prices. This is a far cry from the will-o-the-wisp nature of gray market offerings of a few months ago.

Ingot Capacity Sought—Steel consumers, still unable to obtain all the steel they need, are looking for ingot making capacity in the hopes of arranging conversion deals. Little such capacity is available for the industry has been rather thoroughly canvassed during the past 18 months and the more promising steelmaking units purchased and put to work.

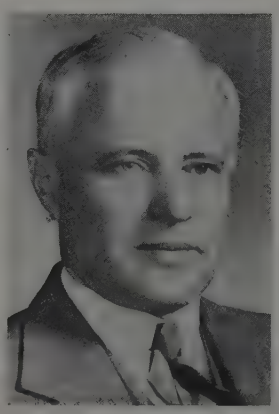
Some steel foundry units, however, have figured in recent deals and others are under negotiation. The Frozen Food Institute recently took over the operation of the Sterling Foundry in the Pittsburgh district and plans to enlarge its steelmaking facilities. A 35-ton open hearth at National Roll & Foundry Co., Avonmore, Pa., recently was placed in operation by Lloyd Steel Co., and Westinghouse Electric Corp. has completed arrangements with United Engineering & Foundry Co. to operate its open hearth at New Castle, Pa.

Steel Lack Trips Expansion

Pipe shortage chief choke-point for gas industry construction, convention told

SHORTAGE of steel, especially pipe, is a major choke-point in expansion of the gas industry.

This was emphasized at the 30th annual convention of the American Gas Association at Atlantic City, N. J., last week. Annual steel needs for pipe alone were estimated at 47,000 tons for distributive facilities and 1,464,000 tons for transmission systems.



DR. KARL T. COMPTON
Who has resigned as president, Massachusetts Institute of Technology, to accept the chairmanship of the Military Establishment's Research & Development Board. He succeeds Dr. Vannevar Bush

Gas industry executives, expecting the stringency in pipe to continue at least two years, stressed importance of their industry in national defense and urged increased diversion of steel to the industry through voluntary allocation.

Financing Problems — Discussing financing problems of the gas industry, Edward Hopkinson Jr., Drexel & Co., Philadelphia, said it needs greater economies to attract investor confidence and greater investor confidence to make the economies possible. One prime essential in breaking through this dilemma, he said, is a cheaper raw material, namely adequate supplies of natural gas, which can be provided by increasing the development of transcontinental pipe lines, which will take an increasing amount of steel.

Edward Falck, chief consultant on power and utilities, National Security Resources Board, Washington, suggested that the gas industry, coupled with an effective voluntary steel allocation plan, might well make an effort to minimize intra-industry competitive buying of steel at premium prices. Such a move, he pointed out, would be beneficial not only to the gas industry but would be welcomed by steel producers and the consuming public also.

Exhibition—Running concurrently with convention sessions was an exhibit which presented more than 1000 new and improved products of 170 manufacturers affiliated with the gas industry.

Robert W. Hendee, president, Colorado Interstate Gas Co., Colorado Springs, Colo., was elected new president of the association, succeeding Hudson W. Reed, chief executive, Philadelphia Gas Works Co., Philadelphia. William F. McConnor, vice president in charge of sales, National Tube Co., Pittsburgh, was named chairman of the industry manufacturers section, succeeding D. B. Stokes, United States Pipe & Foundry Co., Burlington, N. J.

Packaging Show Draws 8000

THIRD annual Industrial Packaging and Materials Handling Exposition at Hotel Sherman, Chicago, Oct. 5-7, attracted more than 8000 visitors. Equipment and materials were exhibited by about 75 companies.

Sponsors of the show, the Indus-

trial Packaging Engineers Association of America, reported that about 150 entries were received in the second annual protective packaging contest.

An educational course on packaging and materials handling was held in conjunction with the exposition, in co-operation with the University of Illinois.

Self-Imposed Priority

Steel construction industry asked to set up own allocation system to curb frivolous building

STEEL construction executives were advised to establish their "own individual allocation and priority system" to guarantee steel supplies to essential construction by T. R. Mullen, president, American Institute of Steel Construction, at the group's 26th annual convention in Quebec last week.

Declaring that "real shortages exist in housing, industrial and commercial structures, stores and office buildings, schools, hospitals, research laboratories and bridges," Mr. Mullen said it would be folly to encourage nonessential construction.

"Steel is too basic a commodity to be wasted. Let frivolous structures be built of other materials, if at all.

"Only in continued demonstration of ability to practice self-restraint can an inefficient system of direct government control and waste be avoided."

Two-Million Ton Year—President Mullen estimated a tonnage of about 2 million tons of fabricated structural steel for 1948. While the industry has the capacity to produce more, he added, the demand for 1949 should continue at about the same rate.

"However, military demands and preparedness program requirements cannot be anticipated," Mullen said. Whether the steel industry will allocate steel in 1949 equal to this year's supply for the construction industry is another indeterminate factor.

Steel Men Speak—More than 500 construction men and their wives attended the sessions in Quebec's Chateau Frontenac, plus about 100 Canadian visitors.

In addition to President Mullen, speakers included: Wilfred Sykes, president, Inland Steel Co., Chicago; David Austin, vice president, United States Steel Corp., Pittsburgh; Walter Chamblin Jr., National Association of Manufacturers, Washington; Prime Minister Maurice L. Duplessis of Quebec; Dr. David B. Steinman, bridge engineer and planner of the projected bridge over the Narrows in New York harbor.

T. R. MULLEN

Plan Electronics Conference

FINAL plans have been completed for the National Electronics Conference at the Edgewater Beach Hotel, Chicago, Nov. 4, 5 and 6. A comprehensive technical program will include discussions of new materials, sound measurement and recording and servo-mechanisms.

Signode Steel To Expand

SIGNODE Steel Strapping Co., Chicago, has purchased a parcel of land at Weirton Steel Co.'s 500-acre industrial development site, Weirton, W. Va. Ground will be broken this month for the first building, 40 x 300 feet, of Quonset hut steel construction with 12,000 square foot floor area. The company has purchased an additional 8 acres for future expansion. Production facilities are expected to be ready for operation by March, 1949.

Develops More Horsepower

ANNOUNCEMENT has been made by the U. S. Air Force of an aircraft power plant which delivers more than 4000 horsepower per propeller as well as several hundred pounds of jet thrust. First use of the giant power plant will be in the air force's Boeing B-54, referred to in earlier announcements as the B-50C, which is an extended development both of the B-29 Superfortress and the new B-50.

Known as the Wasp Major-VDT, the new piston jet propulsion combination consists of a 28 cylinder Pratt & Whitney Wasp Major engine, already the most powerful production piston-type engine, and a two-stage General Electric variable discharge turbosupercharger.

Meetings . . .

Oct. 11-13, American Society of Tool Engineers: Semi-annual convention, Biltmore Hotel, Los Angeles. Society executive secretary is Harry E. Conrad, 1666 Penobscot Bldg., Detroit.

Oct. 11-13, National Lubricating Grease Institute: 16th annual convention, Edgewater Beach Hotel, Chicago. Institute headquarters are at 4638 Mill Creek Parkway, Kansas City, Mo.

Oct. 12-13, Packaging Machinery Manufacturers Institute: 16th annual meeting, Hotel Roosevelt, New York. Institute headquarters are at 342 Madison Ave., New York.

Oct. 12-16, Chicago Section of American Chemical Society: Fifth national chemical exposition, Chicago Coliseum, Chicago. Exposition manager is Marcus W. Hinson, 1513 S. Wabash Ave., Chicago.

Oct. 13-15, American Society of Civil Engineers: Fall meeting, Statler Hotel, Boston. Society headquarters are at 33 W. 39th St., New York.

Oct. 13-15, Porcelain Enamel Institute: Tenth annual forum, at University of Illinois, Urbana.

Oct. 14, American Iron & Steel Institute: Regional technical meeting, The Warwick, Philadelphia.

Oct. 14-15, Gray Iron Founders' Society: Twentieth annual meeting and convention, Haddon Hall, Atlantic City, N. J. Society headquarters are at National City Bank Bldg., Cleveland.

Oct. 14-16, Foundry Equipment Manufacturers' Association: Meeting, Hot Springs, Va.

Oct. 14-17, Electrochemical Society Inc.: 94th meeting, Hotel Pennsylvania, New York. Society headquarters are at Columbia University, New York.

Oct. 18-22, American Institute of Electrical Engineers: Midwest general meeting, Milwaukee. Institute headquarters are at 33 W. 39th St., New York.

Oct. 18-22, Wire Association: 1948 annual convention, William Penn Hotel, Pittsburgh. Association headquarters are at 300 Main St., Stamford, Conn.

Oct. 18-22, National Safety Council: 36th national safety congress and exposition, at Hotels Stevens, Sherman, Morrison, Congress and LaSalle, Chicago. Council headquarters are at 20 N. Wacker Dr., Chicago.

Oct. 20-21, National Conference on Industrial Hydraulics: Fourth annual meeting at Hotel Sheraton, Chicago. Conference is sponsored by Illinois Institute of Technology.

Oct. 21, American Iron & Steel Institute: Regional technical meeting, The Copley Plaza, Boston.

Oct. 21-22, Society of Automotive Engineers: Production meeting and clinic, Statler Hotel, Cleveland.

Oct. 25-27, American Gear Manufacturers Association: Fall meeting, Edgewater Beach Hotel, Chicago. Association headquarters are in the Empire Bldg., Pittsburgh.

Oct. 25-29, American Society for Metals: 30th annual meeting, congress and exposition at Commercial Museum and Convention Halls, Philadelphia. Society headquarters are at 7301 Euclid Ave., Cleveland. The following associations will hold technical meetings in conjunction with the congress: **American Welding Society, Institute of Metals Division of American Institute of Mining & Metallurgical Engineers** and **Society for Non-Destructive Testing.**

Oct. 26-27, American Management Association: Annual meeting of Office Management Division, at Hotel Pennsylvania, New York. Association headquarters are at 330 W. 42nd St., New York.

Oct. 26-28, Purchasing Agents Association of Baltimore: Eighth annual manufacturers' products exhibit, at Lord Baltimore Hotel, Baltimore.

Oct. 27, American Iron & Steel Institute: Regional technical meeting, Hotel Thomas Jefferson, Birmingham.

Oct. 28-29, Porcelain Enamel Institute: 17th annual meeting and sales and management conference, Hotel Stevens, Chicago.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Justice Department seeks to broaden procurement specifications on government purchases to enable small business to obtain larger portion of federal business

JUSTICE Department's habit of delivering solar plexus blows to industry in the name of antitrust law enforcement easily has made it one of the most unpopular government agencies as far as business is concerned. Much less well known is the fact that it has another side; it extends a friendly hand to business in need of assistance.

It does this through its Small Business Unit. The Small Business Unit functioned effectively through the war in helping small business firms to get war contracts and obtain priorities assistance. It proposed the creation of, and later co-operated closely with, the late Smaller War Plants Corp.

Discontinued at the close of the war, the Small Business Unit (which, incidentally, is in the Antitrust Division) was revived in January of 1947 "to invoke all the power which Congress has conferred to maintain full opportunity and competition in business" and "with particular interest in the problem of veterans seeking to engage in new businesses or to re-establish enterprises which they abandoned to enter the armed forces."

Helped Obtain Scarce Materials—Since January, 1947, the Small Business Unit has helped a lot of small businesses devoid of historical positions as customers to obtain scarce materials — particularly steel, pig iron, petroleum, machinery, building supplies and so on. During the last fiscal year, it took care of 225 cases of this type.

The Small Business Unit now is attempting another type of assistance to small business, namely, broadening of standards and specifications that foster monopoly. It is particularly interested in persuading federal agencies, and state and municipal governments to use procurement specifications and standards on which small business can bid freely. More of this will be heard later. This activity is aimed at effectuating Public Law 413 (the Armed Services Procurement Act of 1947) which provides that "a fair proportion of the total purchases and contracts for supplies and services for the government shall be placed with small business concerns."

Services Extended—Up to the present the Small Business Unit has functioned largely in Washington, but now a program is under way to bring its services closer to small business all over the country. The field offices are to handle appeals for assistance right on the spot, and only refer them to Washington if necessary. Such services are being set up in the Justice field offices in Boston, Chicago, Cleveland, Denver, Jacksonville, Fla., Kansas City, Mo., Los Angeles, San Francisco, New York, Philadelphia, Seattle and Detroit.

Chief of the Small Business Unit is Chalmers Hamill who practiced law for many years at Akron, O., and for a time served as general secretary to the late H. S. Firestone, then president of the Firestone Tire & Rubber Co. Later he was secretary and counsel for the National Bellas Hess Co., pioneer mail order house and, before coming with the Justice Department in 1942, had been with the Irving Trust Co., New York.

New Economic Report Coming

REPORT of considerable interest to business is expected to be issued, soon after the next Congress convenes in January, by the Joint Committee on the Economic Report. Dr. Charles O. Hardy, staff director, and his aides, have made a comprehensive study of the economic tools which can be, or could be, employed by the government in fighting undesirable inflation, and undesirable deflation. It is understood the report will contain a number of legislative recommendations.

Ploeser Committee Busy

WHILE the Senate Trade Policies Committee, headed by Sen. Homer E. Capehart (Rep. Ind.) has been in the limelight as the principal congressional group investigating basing price orders of the Federal Trade Commission and their impact on the economy, another congressional group has been busily engaged in exploring another approach. Whereas the Capehart committee is seeking to determine limits within which the commission may proceed in declaring pricing systems legal or illegal, the other group is concerned with determining whether the FTC has enough power to protect small business in the United States against unfair trade practices of large interests.

This other group is the House Small Business Committee of which Rep. Walter C. Ploeser (Rep., Mo.) is chairman. In a swing over a wide area of the country the committee has been hearing complaints from many small firms over unfair methods from which they claim to suffer. Complaints have been heard from automobile dealers, grocers, theatre operators and other business interests who tell of unfair competition from large interests.

Hearings have been held at Butte, Mont., Casper, Wyo., Salt Lake City, Ut., Kansas City, Mo., Omaha, Nebr., Minneapolis, Madison, Wis., South Bend, Ind., Louisville, Ky., and Oklahoma City, Okla. The last field hearing will be held at Houston, Tex., Oct. 11. The committee expects to hold another hearing in Washington and then go into an executive session to consider legislative recommendations to be submitted to the next Congress.

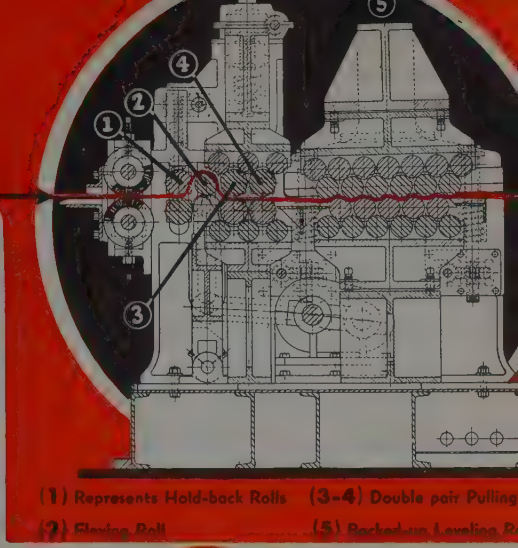
Prevention Costs Less

A BIG clock in the foyer of the Interdepartmental Auditorium on Constitution avenue was the stopper during the sessions of the President's initial Conference on Industrial Safety. It was a grim reminder of the huge loss of life and injuries among workmen in manufacturing establishments. As the minute hand progressed around the dial, red lamps spaced at 4-minute intervals would light up to mark the killing or crippling of one worker and the injuring of 15 others during the preceding 4 minutes.

Another thought-provoker was a tabulation by the Bureau of Labor Statistics of the injury frequency rates for the country's important manufacturing industries. These showed the records in some branches of the metalworking industry to be pretty bad. The rates for this industry, calculated by the American Standards Association formula—the number of disabling injuries multiplied by 1,000,000 and the result divided by the number of man-hours worked—are as follows:

Aircraft 5.2; cutlery and edged tools 23.0; electrical appliances 16.7; engines and turbines 15.0; fabricated

BUDD-McKAY



(1) Represents Hold-back Rolls (3-4) Double pair Pulling
(2) Flexing Roll (5) Backed-up Leveling R

IN operation, a sheet is fed between the brush rolls, the hold-back rolls and into the bite of the pulling rolls which draw it into the machine. After the sheet is securely gripped by the pulling rolls, the flexing roll is automatically shifted from its idle position below the pass line into its upper, or working, position as indicated by (2). This causes the sheet to go into a full quarter turn around the exit side of the hold-back rolls (1), a reverse half-turn upward over the flexing roll (2), and another reverse quarter turn downward around the first top pulling roll (3).

The triple bending, or flexing, of the sheet as it passes in and out of the loop kneads the steel and imparts the desired amount of cold plasticity. A second set of pulling rolls (4) directs the sheet into the backed-up leveling rolls where it is flexed repeatedly and finally ejected a flat sheet.

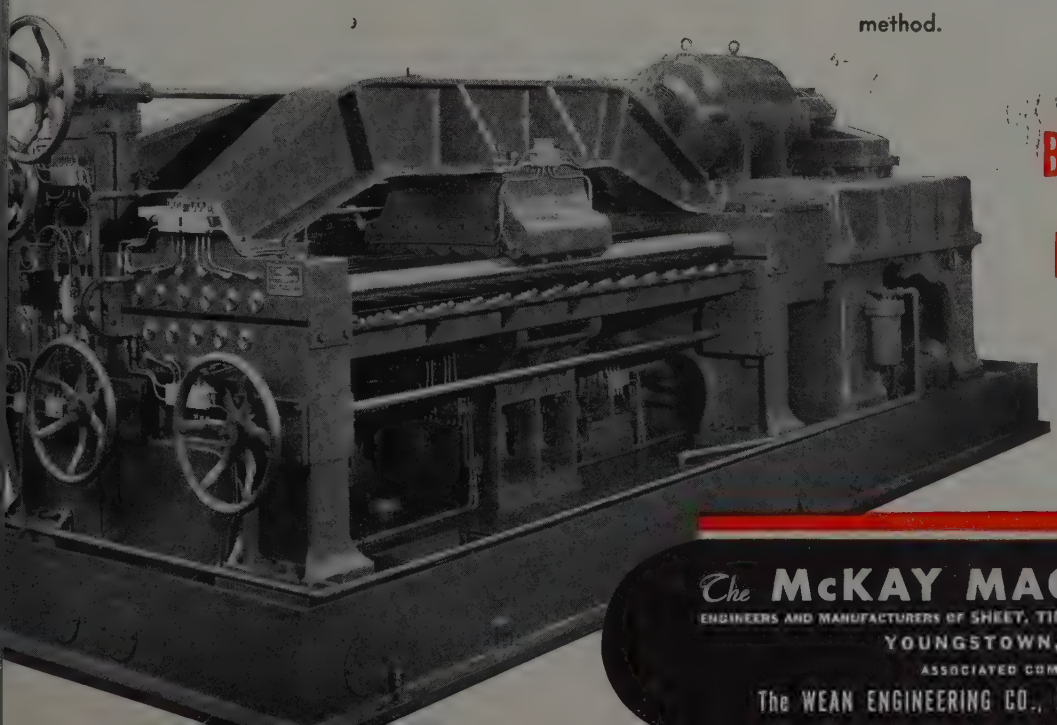
The progressive advancement of the bend throughout the area of the sheet, followed by a pass through the staggered leveler rolls, permits the flexing to be carried much further beyond the elastic limit of the steel than is possible by any roller leveler, thus affording greater freedom from stretcher strains.

While conventional four-high roller leveling machines assist fabricators in securing a suitable texture in steel sheets, yet the mechanical work accomplished is not sufficient to make the sheet altogether immune from surface blemishes. The flexing action of the BUDD-McKAY PROCESSOR frees the grain structure so that, when the steel is drawn under dies to the desired contour, stretcher strains do not occur.

Sheets processed by the BUDD-McKAY PROCESSOR remain free from strains longer because of the extreme flexing and thorough roller leveling, but subsequent forming operations should follow soon after the processing if its full benefits are to be obtained, as a lapse of time causes the sheet to display a tendency to return to its initial condition.

Sheet PROCESSING MACHINE

WITH THE NEW BUDD-McKAY SHEET PROCESSING MACHINE it is possible to render sheets free of stretcher strains. Sheets processed on this patented processing machine have far superior stamping and drawing qualities, and retain these qualities much longer, than sheets processed by any other method.



BUDD-McKA
(PATENTED)
PROCESSOR

The McKAY MACHINE Com
ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUI
YOUNGSTOWN, OHIO
ASSOCIATED COMPANY
The WEAN ENGINEERING CO., Inc. • WARREN, OHIO

structural steel 29.3; steel forgings 31.2; iron foundries 47.3; steel foundries 34.6; metal furniture 21.1; general machine shops 26.6; hardware 13.8; iron and steel 9.5; metalworking machinery 15.8; motor vehicles 10.8; pumps and compressors 25.9; radios and phonographs 7.4; shipbuilding 20.7; tools except edged tools 24.8; wire and wire products 23.7.

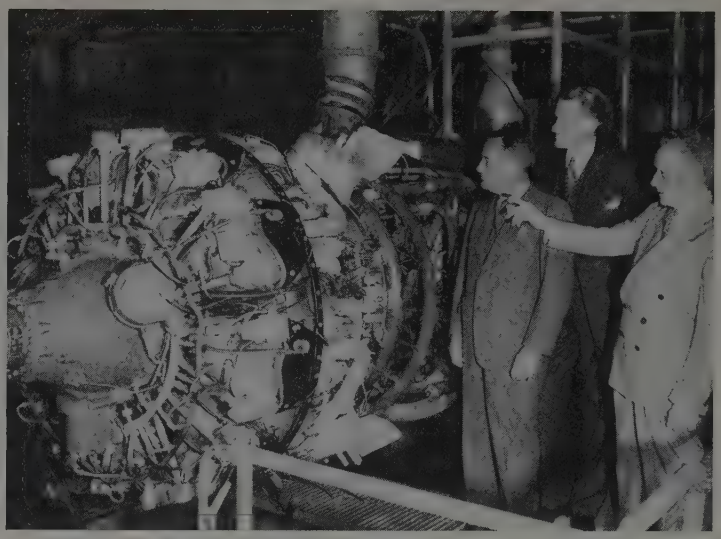
Conducting Investigations — The conference did a fine preliminary job; it set up seven committees, each of which mapped out an agenda of work. At a second conference, to be held in Washington March 23-25, 1949, they will report on studies and investigations to be conducted in the meantime. The committees will devote themselves to accident records and their use, engineering, laws and regulations, education, labor-management co-operation, programs and services, and research.

One of these, the engineering committee, is of outstanding interest to the metalworking industries for its concern is the engineering of safety into manufacturing plants and manufacturing equipment. Chairman of this committee is James E. Trainer, vice president and production manager, Firestone Tire & Rubber Co., Akron. Active members of the committee or its six subcommittees include many executives of the metalworking and other industries, also many professional safety engineers, as well as labor union officers, members of college and university faculties, and representatives of research foundations.

Explaining a line of approach the committee has in mind, Chairman Trainer explained that men under strain are much more liable to accidents than those free of strain. The committee proposes, for example, to draw on the experience of the Air Force, which, by locating instruments and controls in a pattern that permits almost automatic operation, has effected a great reduction in the injury frequency rate among fliers.

Prevention Cheaper—"Industry will have a toll exacted from it in payment for accidents, or in payment for accident prevention," said Mr. Trainer. "It can be readily proved," he went on, "that the cost of accident prevention is lower and that this answer to the problem is more acceptable."

Here is the 1947 toll among industrial workers as compiled by the Bureau of Labor Statistics: 17,000 deaths, 91,000 permanent disabilities and 2,000,000 injuries that caused suffering and lost time. Most of these injuries and deaths involve highly trained workers whose loss from our labor force can ill be spared in such times as the present.



INCREASES PLANE RANGE: Newly-designed Wright Turbo-Cyclone 18 compound engine will increase the range of aircraft by 20 per cent. Navy has authorized production in a $32 million contract to Wright Aeronautical Corp., Woodridge, N. J. Guy W. Vaughan, left, Wright president, William C. Jordan, vice president and general manager, and W. G. Lundquist, right, chief engineer, are shown inspecting the engine which combines a reciprocating engine with three light-weight turbines

Incentive in Government

SEVERAL government departments have adopted the policy of many industrial companies in rewarding employees for money-saving ideas. Recently the Department of the Interior paid $515 to 9 employees for such contributions. The largest amount was $275 given for a suggestion which led to adoption of a "speedletter" which will save Interior an estimated $10,000 annually. Other awards ranged down to $10.

No Special Session

NO special session of Congress will be called to settle the shipping strike on the Pacific Coast. Recently Chairman Fred A. Hartley Jr. of the House Labor Committee mentioned the possible desirability of a special session to give the President more adequate powers for coping with the Coast strike. However, the phraseology which Mr. Hartley employed was not fully quoted; he favored calling of a special session in case the West Coast strike took the form of a threat to the national security—having in mind, of course, the gravity of our relations with the Russians.

Three reasons should prevent Mr. Hartley's mention of a special session for labor legislations from being taken seriously. First, he is not running for re-election and hence has lost his status as a Republican leader. Second, the Republican leadership in the 80th Congress decided against any further labor legislation and is averse to stirring up labor leaders with a special session to pass a new labor law. Third, latest turns in the European situation seem to indicate that the possibility of settling some of our controversies with Russia through peaceful negotiation still exists.

Aberdeen Shows Shelved

SHOW which the Army Ordnance Department used to put on at Aberdeen, Md., proving ground for the Army Ordnance Association the first Thursday in October each year is no longer an annual fixture. When the association changed its name last year to the American Ordnance Association, it also adopted a policy of catering to the ordnance interest in all three armed services. Last year the show was held as usual at Aberdeen. This year the show was staged by the Air Force at the Selfridge Field base near Detroit. No plans have yet been announced for next year, but it will be the Navy's turn in 1949.

Phantom Orders Start

Paper orders for 100,000 machine tools being distributed to 290 builders

PHANTOM orders for 100,000 standard machine tools, to be transformed into actual orders by telegrams in case of emergency, are being distributed by the National Security Resources Board to 290 machine tool builders.

The standby orders are being placed through the Reconstruction Finance Corp., which acted in a similar capacity in World War II.

The machine tool ghost order program is the first of several being readied by the NSRB. (STEEL, Sept. 13, p. 72).

Will Save Time — Between six months and a year of tooling up time will be saved through the standby order plan, estimates Arthur M. Hill, NSRB chairman. The program will enable machine tool builders to make plans and arrangements necessary to get into production on their orders before an emergency arises. Recipients of the ghost orders will be expected to plan financing, personnel, equipment and material requirements necessary to fill the orders and to line up subcontractors.

Pattern for Other Programs — The machine tool program will be watched carefully and will be used as the basis for future phantom order programs. While NSRB has not revealed the programs to follow, industry men are anticipating similar plans for communications equipment, military trucks, electronic equipment, motors, steel and aluminum tubing.

The programs will be revised periodically, to keep pace with changing requirements.

The machine tool orders are being distributed on a basis of builders' capacity as determined by a survey by NSRB in co-operation with the Munitions Board. The study was supervised by Stewart E. Raimel, consultant in the machine tool division of NSRB, assisted by E. R. Henning.

Metal Foil Plant Projected

REYNOLDS Metals Co., Richmond, Va., will establish a $500,000 plant in the Los Angeles industrial suburb of Vernon for the lamination of metal foil.

The move was announced recently by William K. Allen Ferguson, manager of the company's Pacific Coast Division.

Facts for Industry . . .

Nonferrous Castings

Shipments of copper and copper-base alloy castings during July amounted to 72 million lb with seasonal factors bringing down the month's shipments to a level 15 per cent below the 85 million lb shipped in June but slightly higher than the 71 million lb shipped in July 1947. Sand castings at 64 million lb accounted for about 90 per cent of all copper castings shipments for the month. Of the July shipments, 37 million lb were for the producing companies' own use with the remaining 35 million lb for sale to the trade. July shipments of aluminum and aluminum base alloy castings totaled 29 million lb, 19 per cent lower than the 36 million lb shipped in June and slightly lower than July, 1947, shipments of 30 million lb. Shipments of permanent mold castings amounted to 10.5 million lb, sand castings totaled 9.9 million lb and die castings were 8 million lb. Commercial castings shipments represented 76 per cent of the July total with the remaining production going for the manufacturers' own use. Shipments of magnesium and magnesium base alloy castings for July amounted to 554,000 lb, a decrease of 22 per cent from June shipments of 709,000 lb but above the July, 1947, total of 490,000 lb. Commercial castings represented 94 per cent of total shipments of magnesium castings. Zinc and zinc base alloy castings shipments in July amounted to 32 million lb, 13 per cent below June shipments of 37 million lb but slightly higher than the 31 million lb shipped in July of last year. Commercial castings shipments at 22 million lb accounted for 68 per cent of the month's total. Shipments of lead and lead-base alloy die castings amounted to 861,100 lb. *Census Bureau, Commerce Dept.*

Steel Forgings

Commercial steel forgings in July totaled 97,455 short tons, 18 per cent below the 119,532 tons shipped in June. Seasonal factors caused the decline which although below the June figure was about 5000 tons higher than for the corresponding month last year. Cumulative total for the first seven months of the year, amounting to 806,168 tons, is 3 per cent higher than for the corresponding period in 1947. Drop and upset forging shipments amounted to 70,662 tons and press and open hammer forgings were 26,793 tons. Total unfilled orders for the industry amounted to 627,131 tons, slightly under the total at the end of June. *Census Bureau, Commerce Dept.*

Gray Iron Castings

Shipments of gray iron castings, including soil and pressure pipe, during July amounted to 914,464 tons, 15 per cent below June and at about the same level as in July, 1947. For the year to the end of July 7.3 million tons were shipped, approximately the same as shipments during the corresponding period last year. Miscellaneous gray iron castings amounted to 586,916 tons, shipments of molds for ingots 150,947 tons, chilled iron car wheels 50,681 tons, cast iron pressure pipe and fittings, 84,270 tons and cast iron soil pipe and fittings 41,650 tons. *Census Bureau, Commerce Dept.*

Containers and Closures

Reports by manufacturers of containers and closures showed the usual seasonal increase in the shipments of metal cans and a slight decline in steel barrel, drum and pail shipments during July. In terms of steel consumed in their manufacture, shipments of metal cans in July amounted to 310,007 tons. This was an increase of 9 per cent over June but practically no change from shipments in July, 1947. Metal cans shipped for sale to the trade amounted to 374,083 tons, 88 per cent of total shipments. Shipments of steel shipping barrels, drums and pails in July amounted to 2.1 million heavy type steel barrels and drums, 855,911 light type steel barrels and drums, and 4.7 million steel packages, kegs and pails. July shipments represent a decrease for all three types of shipping containers from June with the decreases being as follows: Heavy types 7 per cent, light types 10 per cent and steel packages, kegs and pails 8 per cent. *Census Bureau, Commerce Dept.*

Capital Goods Demand for ERP Heavy

United States manufacturers to receive from one half to billion dollars' worth of capital goods business from ECA through first half of 1949

CAPITAL goods procurement under the European Reconstruction Program should take somewhere between 20 and 40 per cent of the first year's appropriation, according to advices in Washington from Paris. That is, the Economic Cooperation Administration will be asked to earmark for the procurement of capital goods during the year ending June 30, 1949, somewhere between $1 and $2 billion.

On the basis of experience, substantially half the the capital goods procurement under the ERP program takes the form of trading between the 19 participating European countries, with the other half of the goods coming from the United States. That means procurement of from half a billion to one billion dollars' worth of capital goods should be the portion of American industry during the present fiscal year. And, because food and other consumer goods have predominated in the ERP procurement program so far, the great bulk of this buying remains to be developed.

In other words, American manufacturers of various types of equipment should receive a large amount of business over the first half of the calendar year 1949.

The above represents information of a preliminary character; however, it probably is not too far out of the way. The final figures should be available around the latter part of October when the ECA in Washington expects to receive the CEEC program for the first fiscal year as screened by the Paris office of ECA.

Eligible Commodities—In the meantime, effective Oct. 1, the ECA expanded to 85 the number of commodities eligible for procurement under the ERP program. The additions include mainly capital goods and materials. Such items now include steel, fabricated steel products, nonferrous metals, generators, motors, electrical equipment, engines, turbines, construction equipment, mining equipment, machine tools, metalworking machinery, agricultural equipment, textile machinery, office machinery, vehicles, tractors, aircraft and parts, ground handling equipment for airplanes, vessels and parts, scientific and professional instruments, rail transportation equipment, and a general classification of industrial equipment.

ECA is working on ways and means of informing the public, especially the business public, more fully about details of its procurement authorizations. For instance, a blanket authorization will be issued at the beginning of each quarter for the machinery to be procured by each country in the ensuing quarter—and these figures will be made public.

Individuals Do Buying—However, no information system that will help American manufacturers in their hunt for business so far has seemed feasible. This is because the actual buying is done by the actual consumers in the participating countries. The only way to get orders for machinery under the ERP program is to canvass and sell individual machinery buyers in the United Kingdom, France and all the other countries. By the time the buyers make necessary financial arrangements with their governments, and that information is on its way to becoming public, it is too late; the details of purchase already have been arranged between the buyer and his source. In other words, American manufacturers desiring to get business under the ERP can do it only by arranging for representation to drum up orders at the source.

The biggest capital goods procurements under the ERP, it now appears, will be for equipment for petroleum drilling, refining and storage, for a number of projected steel plants, for a large amount of mining equipment, for fairly large quantities of textile and timbering equipment, and for a substantial amount of electrical equipment. France alone has a steelworks project to require about $40 million, while Austria has a steelworks project expected to be of about the same size dollarwise. Greece is down on the long-term agenda for possibly seven or eight hydroelectric generating plants.

Recovery, Not Relief, Needed

SOME control should be exercised over purchases made by the participating nations in the European Recovery Program in order to make it a recovery and not merely a relief program, was the opinion expressed by A. G. Bryant, president, National Machine Tool Builders' Association at a press conference in Cleveland last week.

Although relief is necessary to strengthen the health and morale of most Europeans, Mr. Bryant stated, outlays for capital goods including machine tools and machinery must be made in order to get recipient nations back on their feet. In order to avoid charges of imperialism, he continued, we as a nation have given each of the participants the right to do all their own ordering. Our administrators mindful of the dictates of Congress have leaned over backwards in hesitating to suggest what purchases should be made with ECA dollars.

Unless we want to continue supporting Western Europe from now on and draining our own resources to do so, Mr. Bryant continued, we must take a more practical stand and see to it that the requests of European manufacturers for American tools and equipment are satisfied.

Seek More Manganese

AS PART of its intensified drive to obtain strategic and critical materials for stockpiling, the Munitions Board is giving special attention to manganese. While the Russians are continuing to ship faithfully on their manganese contracts, and indeed have stepped up the tonnage to us, the problem is one of developing alternate large-tonnage sources to insure maintenance of supplies under any eventuality.

Under the direction of the Munitions Board, the Bureau of Federal Supply has sent two teams of investigators to the two manganese sources which seem to offer most promise—India and the Union of South Africa.

Transportation Is Problem — The big difficulty in these two countries is transportation from the mines to seaboard, and the missions have been instructed to ascertain what must be done to get the railroads there into shape to handle the assignment. The railroad equipment, together with some necessary mining equipment, of course, would come from the United States.

No mission will be sent to Brazil; United States companies with manganese concessions in Brazil are expecting to make arrangements to get out more tonnage at the mines and effect improved transportation facilities from the mines to seaboard. The matter is being handled by the Munitions Board through its Ferro and Nonferrous Additive Alloy Industry Advisory Committee, on which all the ferroalloys manufacturers and several steel producing companies have membership.

BRITISH TOOL SHOW: Machine tools representing the postwar development of British, as well as American, Swiss, Belgian, Czech and French engineers were shown at the Machine Tool & Engineering Exposition in Olympia Halls, London. The show demonstrated that European engineers have largely caught up with the lag in design development enforced by the war

British Exports Rise

Overseas shipments of steel and finished products in 1948 to top last year's slightly

DIRECT exports of British steel for 1948 will approximate about 2 million tons, which is slightly in excess of last year's figure.

Much more could be exported were it not for the government policy of diverting most of the production to home manufacturers with the object of increasing the export of finished products. Overseas shipments of finished goods for 1948 are likely to be slightly higher than last year. Exports of machinery, vehicles and electric motors have increased markedly, and these product categories have also absorbed the bulk of the greater steel production during the year.

Huge Argentine Order—One of the largest single export orders has been placed by the Argentine government for 250,000 tons of rails for delivery over six years. The $24 million contract has been divided among rail makers in northeast England, Scotland and south Wales.

Scrap continues to be one of the major limiting factors in production; nor has the British-United States agreement on German scrap greatly brightened the outlook. New steel plants coming into operation in the near future will absorb greater quantities during the next 12 months, thus heightening the demand which has not been slaked even by steadily mounting German imports in recent months. Largest new steel plant ready for production soon is the Round Oak Steel Works in South Staffordshire where capacity will be doubled and scrap consumption boosted from 3000 tons weekly to 4000.

French Wince at Shot in Arm

FRENCH industry, shaky and groggy from its struggle to survive, fears a severe reaction from the government's most recent shot-in-the-arm to the nation's economy.

The latest remedy is an assembly-approved financial program designed to raise about 80 billion francs in new taxes and to cut 20 billion francs in civil and military expenses. Industry, to survive, must have economic stability in the nation, but the measure to raise industrial profit taxes by 20 per cent, as one way to raise the 80 billion francs, is viewed in many sources as disastrous. The tax increase also hits personal incomes, and protest strikes have already flared up, with consequent disruptions. Renault auto workers in Paris were out for a few days and laboring forces in the electricity and gas plants have launched a series of staggered warning walkouts.

Brighter Side — To the credit of the new program are the measures designed to cut nationalized industry costs and to pare down absenteeism. A special committee has been set up to control purchase contracts in the nationalized coal, electricity and gas undertakings. Before next April management personnel must be reduced by 10 per cent in these enterprises. Discipline rules and sanctions have been tightened in the coal mines to reduce absenteeism.

Production of pig iron amounted to 608,000 metric tons in France and 110,000 tons in the Saar during August, or about 90 per cent of the 1938 average monthly output. Production of steel ingots and castings was 607,000 tons in France and 212,000 tons in the Saar during the month. Although these ingots and castings tonnages were slightly below July output, the trend is still upward.

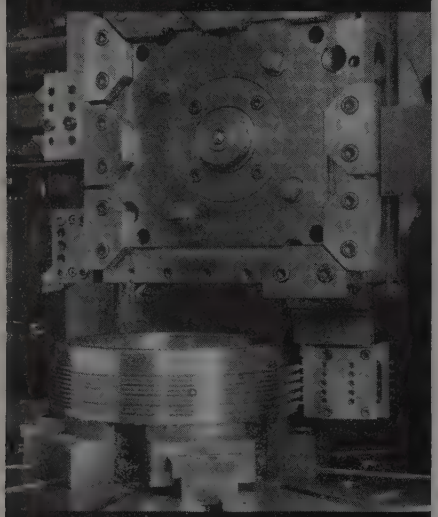
Germans Protest Dismantlings

ALLIED plans to boost western German steel production to 10.7 million tons annually cannot be realized if dismantlings continue, according to Dr. P. Volz, steelman from Duisburg, who spoke before a recent meeting in Dusseldorf of Verein Deutcher Eisenhuettenleute, German counterpart of the American Iron & Steel Institute.

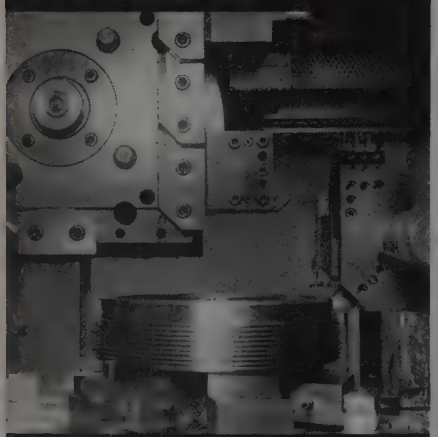
Dr. Volz argued that the originally specified purpose of dimantlings, to throttle war potential, would have been realized without one plant being torn down in Bizonia. War damage and the divorcement of the Soviet zone and the Saar, where many key plants are located, would have accomplished this purpose.

Takes Three Years — Three years of production are lost, he declared, from a plant which is dismantled, for it takes 36 months for the unit to be torn down and set up again. Dismantlings are also taking the most modern plants or facilities producing scarcest items, like seamless tubing, plates and specialty products. Dismantlings, war damage and the general disruption have jumped mill repair costs per ton of steel to three times what they were in 1938.

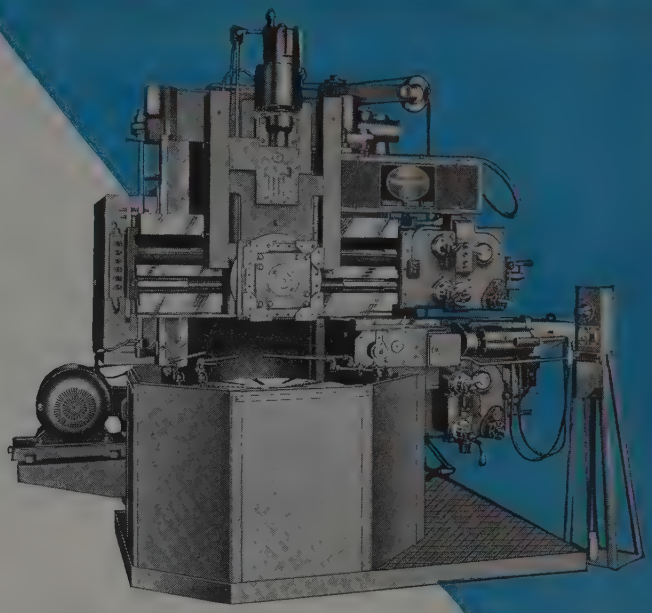
This is the first finning operation—finish turn OD of fins and semi-finish turn shoulder diameter—face flange and form shoulder radius and rough cut fins.



Here Man-Au-Trol utilizes the angular turning attachment to generate the top surfaces of the fins. 5 cutting tools instead of 3 are working simultaneously as in the roughing operation.



This is the final finning operation—the under surfaces of the fins are generated using 5 cutters in the turret head, while side head turns the shoulder.



BULLARD 30" Man-Au-Trol Vertical Turret Lathe versatility solved a brake drum problem for Copperweld Steel Company Brake Drum Division. It reduced the machining time for their delicate finning operation from 80 minutes per drum for the only previously successful method to 18 minutes per drum. The Man-Au-Trol method not only successfully provided a finning method, but also took additional cuts not previously possible without additional set-ups.

Several of the Man-Au-Trol functions are pictured and described on the accompanying close-ups.

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BULLARD MAN-AU-TROL

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Auto builders see chance to reach 5.5 million units in 1948. October may be best production month of year, barring shortage of sheet steel stocks

DETROIT

ASSEMBLIES of passenger cars and trucks snapped back sharply the last week in September to around 120,000, including Canadian output, the best total in several months and close to the weekly peak for the year. On the basis of a 40-hour week, this is the equivalent of a turnout of 50 cars and trucks every minute. The pace continued last week and, barring a possible curtailment because of a sudden exhaustion of sheet steel stocks, October may well prove to be the high month of 1948. Nine-month aggregate figures to something over 4,000,000, with hopes running high that another 1,500,000 may be run out in the fourth quarter to bring the year to the 5,500,000 which had been forecast last January.

Contributing to the sharp upturn in production was the resumption of full operations at all Chrysler plants, following the tieup occasioned by the futile strike of plant guards at Briggs Mfg. Co. This was one of the silliest walkouts ever participated in by the UAW-CIO, with 100,000 or more production workers losing millions of dollars of income for the ostensible purpose of supporting the cause of 170 disgruntled plant guards who were not even members of the same union. The windup was that UAW officials finally put enough pressure on the guards to force a settlement on terms originally offered by the company. Meanwhile, Briggs and Chrysler plants had time to get caught up a little on steel inventories and engine castings which were becoming seriously depleted. In view of the financial licking taken by its members, the UAW is going to be pretty careful in the future about throwing its support to grievances of small, isolated groups. Some new kind of strategy will have to be worked out in such cases.

Truck Output Holds Up—Truck and commercial car production continues to hold a high percentage of total output, despite reports of some softness in sales of heavier hauling units. Currently, trucks are running about 23 per cent of total vehicle output. In the truck field, Dodge is planning shortly to announce what is described as a "sensational" line of "route vans", small units for house-to-house delivery of milk, baked goods, etc. They are reported to embody a number of mechanical features formerly limited to passenger cars.

With production holding to a plateau of about 10 per cent ahead of last year, repeated interruptions occasioned by labor and materials problems notwithstanding, the current 12-month period is likely to come close to equaling the industry's peak year of 1929 when slightly more than 5,600,000 vehicles were assembled in U. S. and Canadian plants. There is some question over whether this high level of output should not be considered the industry's practical capacity, even though physically auto plants have been geared to produce perhaps 7,500,000. Some observers are of the opinion that long before sufficient labor and materials have been corralled to permit realizing a rate based on the latter figure, the market is going to sag and schedules will have to be trimmed.

To Cut Prices or Output?—One school of thought holds to the belief that once weakness develops in the market, prices should be lowered to the point where demand can be quickened enough to restore peak production schedules. However, as it has worked out in other industries, the tendency is to reduce manufacturing schedules when demand falls off, on the theory that currently high wage and materials costs will not permit any reduction of prices. Chances are the motor industry will follow both routes — ease off on manufacturing a little and then try the stimulant of a price cut.

These eventualities now appear a long way over the horizon, and the motor industry is incessantly prodding suppliers for more materials. Steel, of course, is basic and auto company buyers are probing every means of stepping up their intake of sheet and strip stock. Every company wants more steel for 1949 than it received this year and there is constant worry that steel companies may trim allocations.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1948	1947
January	422,236	366,205
February	399,471	393,663
March	519,154	443,588
April	462,323	445,137
May	359,996	404,191
June	454,401	421,466
July	489,736	399,456
August	478,168	364,478
September	429,000*	444,501
9 mos.	4,025,000*	3,682,685
October		461,536
November		417,493
December		492,109
12 mos.		5,055,284

* Preliminary.

Estimate for week ended:

	1948	1947
Sept. 18	94,410	109,734
Sept. 25	98,394	106,894
Oct. 2	120,065	101,608
Oct. 9	120,000	98,978

Estimates by Ward's Automotive Reports

Need More Steel

REFERENCE in these columns last week to changes in the 1949 program for Chrysler body stampings included the statement that Briggs Mfg. Co. would handle less steel stamping work than it did this year. According to Briggs' spokesmen, this is in error, and actually the company will need more flat-rolled steel next year than it will have received this year to complete its share of Chrysler schedules. What steel suppliers would like to know is this—with the Budd Co. taking on a larger share of Chrysler stamping requirements, with Briggs needing more steel than before, and with Dodge erecting a large new sheet metal plant of its own for truck stampings, then who is losing the current business which next year will be handled by these new or "plus" sources?

Supervisors Get Break

PACKARD has announced the institution (later this month) of a liberalized policy toward approximately 750 members of its supervisory force in

DOLLARS FOR BRITAIN: Ready to bring dollars to Britain in her great export drive is this stream of Ferguson tractors and Vanguard cars coming off the production lines in Coventry, Eng. Seventy per cent of output is being exported. NEA photo

the factory and the field, designed to emphasize their close connection with management. Major features include: Elimination of clock-card punching by nearly 550; three-week vacations instead of two; substitution of small identification cards for badges; and overtime work only as exigencies demand or on approval of a company officer.

The program has been in process of formulation over the past several months and will involve additionally the setting up of four classifications of management: (1) Administrative executives; (2) executives; (3) supervisors; and (4) staff. Those in the latter group are described as professionals and specialists who report to executives but whose work is on a par with that of supervisors. The policy is the latest step in Packard's formation of a unified factory management team. Earlier an executive-supervisor council had been established to strengthen lines of communication between members of management on all matters affecting them as individuals, and on general operations of the company. At the same time, members of supervision have been holding get-acquainted outings at company expense quarterly. The latest of these was held Sept. 25 when about 500 of the company's management team spent a day of recreation and sports activity at the Packard 550-acre Proving Grounds near Utica, Mich.

Packard directors, incidentally, have postponed indefinitely any recommendation to the company's stockholders that a reduction be made in the 15,000,000 shares now outstanding. A few months ago there was talk of an exchange of stock on a one-for-three or one-for-five share basis; directors apparently decided the time was not ripe for such a move and stockholders have been so advised, along with a 20-cent dividend distribution payable Oct. 18. Last dividend was 15 cents, paid March 29, making total distribution to stockholders this year of $5,226,969.

Willys Unveils New Models

WILLYS-OVERLAND'S third annual institutional day drew a crowd of over 700 industrialists, educators, editors, publishers, bankers and government officials last Wednesday. Visitors inspected progress of modernization programs being carried out in the company's Toledo plants, studied exhibits of numerous pieces of industrial and agricultural equipment designed for use in conjunction with the Willys jeep, and were given a peek at new models now ready for production and an insight into the company's long-range production plans.

Ford Output Up

FORD has announced production of 118,271 passenger cars, trucks, tractors and busses during September, making the month the highest since May, 1941, and indicating the company now is really rolling in high gear. Breakdown shows 67,081 Fords, 17,421 Mercurys, 5089 Lincolns, 18,829 Ford trucks, 9733 tractors and 118 busses. Canadian assemblies, not included in the above figures, totaled 11,120 cars and trucks. Thus, Ford's share of the industry's output for September rose to 28 per cent, against only a little better than 17 per cent for the first eight months of the year.

Used Cars Graded

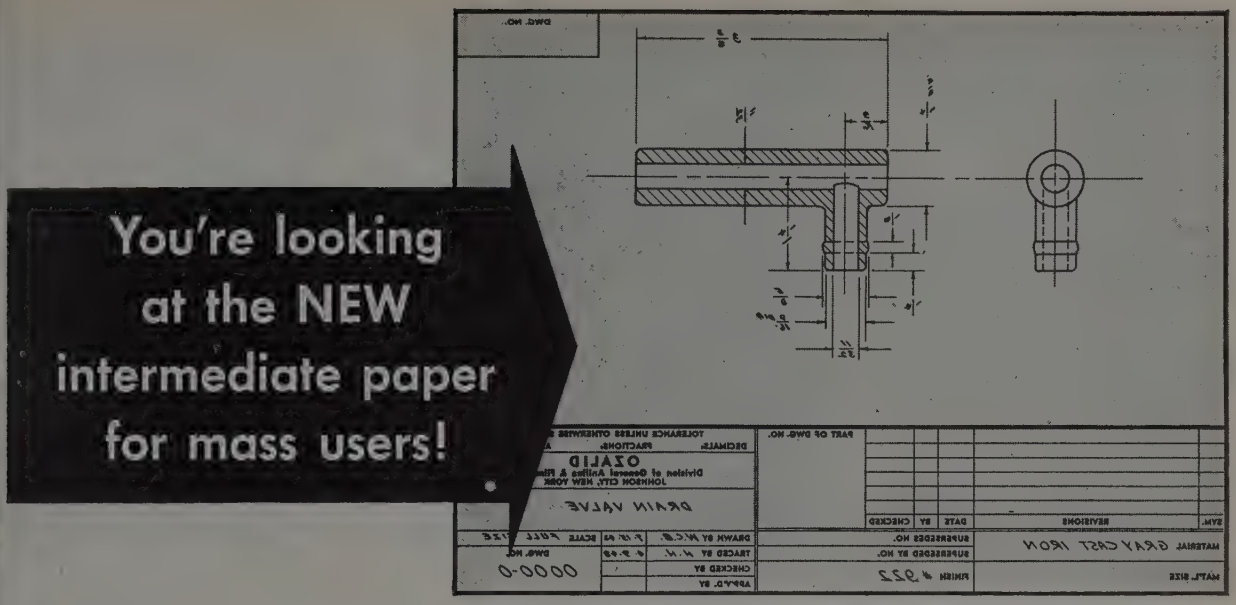
KAISER-FRAZER dealers in Chicago are inaugurating an integrated used-car merchandising program involving the grading and identification of used cars in three groups: Good, better and best. Bronze, gold and silver stickers are affixed to windshields of reconditioned cars, indicating their classification, and in each group certain specific standards of warranty have been set up.

Said to be the largest industrial public address system ever installed, a network of 600 loudspeakers has been positioned around the Kaiser-Frazer plant at Willow Run into which news, music and service programs may be piped at intervals from a 5200-watt sending apparatus. In addition to music and entertainment, employees' ears may be assaulted with a wide variety of other material, including reports of weather and highway conditions in winter. Principal problem which technicians had to whip in fitting out the system was that of making broadcasts clearly audible over various machinery noises throughout the 84-acre plant, without blaring or distortion.

An assembly plant for K-F automobiles is being erected at Rotterdam, Holland, and should be ready by January to handle 24 cars a day, shipped knocked-down from Willow Run. Dutch capital holds a majority interest in the undertaking, and K-F will supply some assembly equipment.

Dutch Iron Still Good

DUTCH pig iron, available to United States buyers in only small quantities, is up to prewar standards, say representatives in this country of the leading Netherlands producer. A tonnage of the Dutch iron, purchased by Packard Motor Car Co. and noted in these columns (Aug. 9, p. 59) as being inferior in quality, was "off-grade pig iron," sold and bought as such, and was irregular in size and analysis. The off-grade iron was an accumulation of the war years. Regular quality Dutch iron, the representatives point out, is guaranteed to conform to analysis and standard size.



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No Tendency To "Bleed"

The dye image will not offset or transfer to other papers or tracings with which this new Ozalith paper has been placed in contact. There is no tendency to "bleed."

Ozalith is coated on a 100% rag base of great mechanical strength. It will not deteriorate appreciably with age. It is the most durable intermediate paper known.

Pen And Pencil Additions

You can wash Ozalith with a damp cloth —dust, dirt, and grease will come off quickly. Water will not cause the base to cockle or the image to run.

Pen or pencil additions can easily be made on either side of an Ozalith print. Because of its high transparency, contact prints should be made, and additions then made on the unsensitized surface.

Ozalith is a running mate to Ozacloth —but because of its low price, it is ideal for mass users. Write, today, if you would learn more about this and other Ozalid prints.

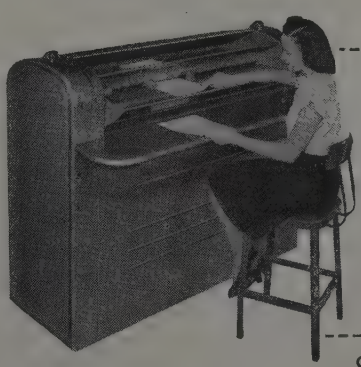
ALL OZALID PRINTS PRODUCED IN SAME MANNER

★ **No tie-ups when you shift from one type of print production to another. Simply choose your Ozalid material . . . and your Ozalid print-making machine exposes and dry develops it. Standard work prints are produced in 25 seconds.**

★ **Your drawings can be up to 42 inches wide, any length. Roll stock or cut sheets can be used. (Special machines accommodate 54" wide drawings.)**

★ **You—or anyone else—can be the operator. A few hours and you're an "expert."**

★ **See *all* the Ozalid prints you may make from any drawing . . . and learn full story. Mail coupon today.**



DEPT. NO. 190

OZALID . . . A Division of General Aniline & Film Corp., Johnson City, New York

Gentlemen: Please send free copy of Ozalid Streamliner booklet illustrating all types of Ozalid prints.

Name_____ Position_____

Company_____

Address_____

_____

Ozalid in Canada—Hughes Owens Co., Ltd., Montreal

New Plant in 7 Months

Yale & Towne starts operations in new specialties factory in Virginia

SEVEN months after plans were completed, Yale & Towne started production in its new specialties division lock plant in Salem, Va. The 127,000 sq ft layout, designed and built by Austin Co., Cleveland, will be used for integrated production of specialty locks for automobiles, aircraft, bicycles, business machines and scores of other manufactured products.

An ingenious reversible heating and ventilating system is incorporated in the single-story, flat-roof structure. Monitors have been almost completely eliminated and plant will rely on artificial light.

The plant has been laid out with a view to future expansion, with concrete block instead of brick in the temporary end wall.

The building has structural steel frame with columns on 30 x 40 ft spacing and a welded steel roof deck with fiberglas insulation.

Assembly department tables in Yale & Towne's new specialties plant are arranged parallel with continuous fluorescent troffer units which provide uniform general illumination

Enlarge Truck Output

INCREASE in production of at least 20 per cent is expected by Mid West Body & Mfg. Division, Paris, Ill., truck body builder, at the completion of its $200,000 expansion program. New manufacturing equipment is being installed and production processes are being rearranged to streamline production and permit a more continuous flow of materials through the plant. An entire battery of new punch presses, power brakes and metalworking equipment has been installed, new dock loading facilities have been provided, concrete flooring put in and a new interior paint scheme adopted to improve working conditions and increase output.

At present, Mid West's production of stake, platform and farm truck bodies is at the rate of close to 60 a day. Additional facilities will enable expansion to at least 75 bodies a day.

Railroads Establish New Lab

PLANS for the construction of a laboratory and headquarters for the research and testing staffs of the Mechanical and Engineering divisions and the Container Bureau of the Association of American Railroads have been announced by William T. Faricy, AAR president, and Dr. Henry T. Heald, president of Illinois Institute of Technology. This laboratory will be located on Illinois' campus in Chicago.

The $600,000 unit will contain offices, laboratories for mechanical and electrical engineering, refrigerator car and packaging container studies and a humidity room for controlling testing conditions. Alongside the building will be a 600-foot impact test track.

Ohio Appliance Maker Expands

CLYDE Porcelain Steel Corp., Clyde, O., has begun a $2 million expansion program which will increase its plant area 70 per cent.

The expansion will enable the company to manufacture additional products for Bendix Home Appliances Inc., including dryers and ironers. The company will continue producing all Bendix automatic washers.

"Old Mary" Gets New Lining

"OLD MARY," oldest blast furnace in the Youngstown district, will be down for six weeks to two months while she acquires the new look, in the form of a relining.

The furnace, located at Lowellville, O., and owned and operated by Sharon Steel Corp., is over 100 years old, having been built in the 1840s. Since then, the unit has been rebuilt several times and has just finished about six years on her last relining job. When Sharon purchased the Farrell works from Carnegie-Illinois Steel Corp., this furnace, included in the deal, was expected to have been slated for retirement, but she got a new lease on life as a producer for the Lowellville specialty steel plant.

New Hampshire Foundry Formed

AMOSKEAG Steel Corp., recently formed at Manchester, N. H., has begun production of medium-sized carbon and alloy electric steel castings.

Firm is also equipped to make x-ray photographic inspection of finished castings up to a maximum cross section thickness of 2-3/4 in. Carl S. Nute is president of the new company and Joseph Prendergast is vice president and general manager in charge of operations.

AC Gets Computer Contract

AWARD of a contract involving more than $23 million for manufacture of bombing navigation computers to AC Spark Plug Division, General Motors Corp., Flint, Mich., was announced recently by the Procurement Division, Air Materiel Command Headquarters, Wright-Patterson Air Force Base, Dayton, O. The instrument was developed by Sperry Gyroscope Co., New York.

Former A. O. Smith landing gear plant in Milwaukee is being provided by War Assets Administration and will be converted for manufacture of the precision bombing equipment.

AC has also been awarded an additional contract valued at $1.5 million for type A-1-B gun, bomb, rocket, gyro computer sights.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Allegheny Ludlum Steel Corp., Pittsburgh, will hold open houses at its West Leechburg, Pa., plant Oct. 18-20 and at its Dunkirk, N. Y., plant Oct. 19-20.

—o—

General Industries Inc., Ft. Wayne, Ind., has begun production of prefabricated houses costing about $6000, complete with land.

—o—

Bell Aircraft Corp., Buffalo, has purchased the entire capital stock of W. J. Schoenberger Co., Buffalo, maker of valves and fittings. Schoenberger, acquired for about $2 million, will be operated as a subsidiary.

—o—

Economy Engineering Co., producer of portable elevators and other materials handling equipment, has moved its manufacturing facilities to 4511 W. Lake St., Chicago. New plant has double the area of the old unit.

—o—

Vic Pastushin Industries Inc., Los Angeles, maker of airplane parts and sheetmetal products, has received certification from the Air Force for the heat treatment and anodizing of aluminum alloys and alclad.

—o—

Wright Aeronautical Corp., Woodridge, N. J., subsidiary of Curtiss-Wright Corp., has received a $32 million order from the Navy for production of a new 18-cylinder, compound engine and the standard 18-cylinder engine.

—o—

Symington-Gould Corp., Depew, N. Y., has sold its Rochester, N. Y., plant to a group of industrialists headed by Saul Frankel, president of Rochester Iron & Scrap Metal Co. The plant, to be known as Symington Industrial Terminal Corp., will probably be offered for rental in whole or in part to manufacturers.

—o—

Walker Hydraulic Duplicator Co., Standish, Mich., has been formed by C. E. Walker to produce hydraulic duplicating attachments for machine tools.

—o—

Worthington Pump & Machinery Corp., Harrison, N. J., manufacturer of pumps, power plant equipment and many other products, is conducting a six-months course for 25 foreign students.

—o—

Radio Manufacturers Association reports member companies produced 64,953 television receivers in August, a record production which exceeds the July output by almost 10,000 units.

—o—

Lalance & Grosjean Mfg. Co., Woodhaven, N. Y., has begun production of restaurant cooking utensils made of Rosslyn Metal, a product of American Cladmetals Co., Carnegie, Pa.

—o—

Federal Bearings Co. Inc., Poughkeepsie, N. Y., has raised prices on its entire anti-friction bearing line because of mounting costs.

—o—

United States Steel Corp., Pittsburgh, has opened a district office of the Coal Chemical Sales Division in the Russ Bldg., San Francisco. W. G. Souder is in charge.

—o—

Canadian Liquid Air Co. Ltd., Montreal, Que., has recently received an order from International Nickel Co. of Canada Ltd., Copper Cliff, Ont., for a unit called an Oxyton which will produce 300 tons of oxygen daily.

—o—

Westinghouse Electric Corp., Pittsburgh, reports its plants located in the following cities have received the distinguished service to safety award of the National Safety Council: East Springfield, Mass.; Sunbury, Pa.; South Philadelphia, Pa.; Newark, N. J.; Lima, O.; Lansdowne, Md.; Baltimore; Chicago; Atlanta; St. Louis; and Philadelphia.

—o—

Link-Belt Co., Chicago, has appointed Nortons-Tividale Ltd., Tividale, Tipton in Staffordshire, England as a vendor and manufacturer in the United Kingdom of Link-Belt's Float-Sink Concentrator, equipment for use in connection with the heavy media process of cleaning coal and concentrating minerals.

—o—

Furnace Engineers Inc., designer and builder of heat treating furnaces for the steel industry, has purchased an office building at 1551 W. Liberty Ave., Pittsburgh. Engineering and general offices of the corporation have been located there since the firm was founded in 1943.

—o—

Jones & Laughlin Steel Corp. announces Kelsey-Hayes Wheel Co., Detroit, will take over its entire McKeesport works immediately. Under the original plan J & L was to retain a portion of the plant for fabricating mine cars and barges. Kelsey-Hayes, in taking over the entire plant, will continue fabrication of the barges and mine cars now on order.

—o—

Motor Products Corp., Detroit, announces that its Deep Freeze Division, North Chicago, Ill., has purchased Frostair Division, Morrison, Ill., from General Tire & Rubber Co. The Morrison operation, manufacturing a home refrigerator unit, will be transferred to North Chicago.

—o—

American Washer & Ironer Manufacturers' Association, Chicago, reports that factory sales of standard-size household washers in August totaled 362,169, sixth highest sales in history.

—o—

Sears, Roebuck & Co., Chicago, has purchased a substantial stock interest in Kaiser Fleetwing Inc., Bristol, Pa., a Henry J. Kaiser interest. The Bristol plant will be expanded to produce porcelain enamel steel sanitary equipment exclusively for Sears.

—o—

Automotive Joint Industry Conference Group on Hydraulics has prepared a code of Hydraulic Standards for Industrial Equipment.

—o—

Texas Electric Service Co. has ordered a 65,000 kilowatt generator from Westinghouse Electric Corp., Pittsburgh, for installation in the Fort Worth, Tex., area. The generator will be built by Westinghouse plants in South Philadelphia and East Pittsburgh.

—o—

United States Steel Corp., Pittsburgh, common stockholders of record on Aug. 6, numbered 166,990, a decrease of 902 since May 7.

—o—

Keystone Steel & Wire Co., Peoria, Ill., announces its shareholders have approved an increase in the company's capital stock. Shareholders of record on Oct. 1 will be issued two additional shares for each share held.

—o—

Dexter Washing Machine Co., Fairfield, Iowa, has purchased the Nash-Kelvinator interests in Appliance Mfg. Co., Alliance, O., maker of washing machines. Dexter and Nash-Kelvinator had owned the Alliance firm jointly.

—o—

Ashland Oil & Refining Co., Ashland, Ky., has added nine more tank barges to the fleet of 15 now under construction at Dravo Corp.'s shipyard in Pittsburgh.

The Business Trend

INDUSTRIAL production reached a new postwar high in the week ended Oct. 2, when STEEL's index rose 6 points from the preceding week to a preliminary 175 per cent of the 1936-1939 average. The figure recorded for the most recent period is 3 points higher than the previous postwar high of 172 attained during the week ended Aug. 14.

Steel ingot production was at 96 per cent of capacity for the third consecutive week to help make the new mark possible.

AUTOMOBILES—One of the biggest factors responsible for sending STEEL's index zooming to a new mark was the large gain in output registered by the automobile builders of the United States and Canada. The industry topped the preceding week's figure by 21,680 units during the week ended Oct. 2, reaching an output of 120,065 cars and trucks, third highest mark of the year.

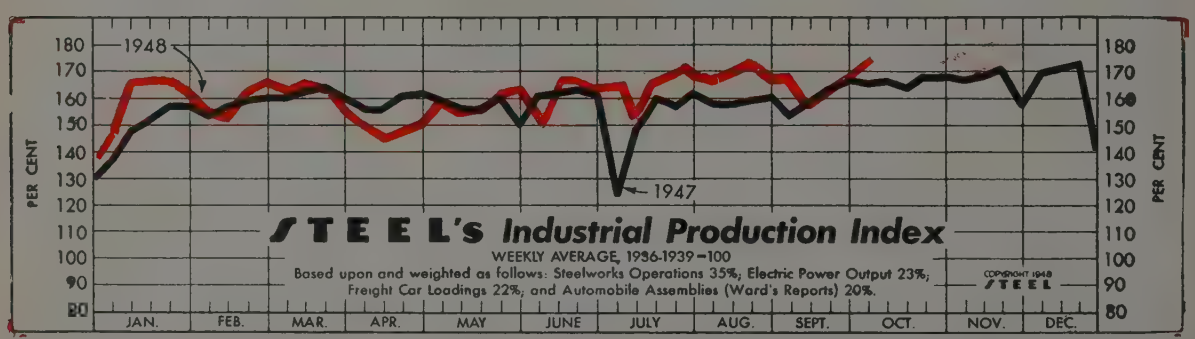
ELECTRIC POWER—Indicative of the high rate of industrial activity in the nation is the report by the Federal Power Commission that power production by electric utilities during August, 1948, climbed to a new monthly high of more than 24 billion kilowatt-hours, topping the previous record set in January of this year by 1.1 per cent. An additional 4.5 billion kilowatt-hours were produced by industrial generating plants, including those of the railroads.

PETROLEUM—Based on actual industry conditions and policies in effect, Bureau of Mines estimates the amount of domestic crude petroleum that will be consumed or exported in October, 1948, at 5,620,000 bbl daily. The bureau's forecast for the month includes estimates of total gasoline demand of 81 million bbl, total crude runs to stills of 5.7 million bbl daily and a gasoline yield from crude of 40.2 per cent.

PRICES—Wholesale prices decreased 0.3 per cent during the week ended Sept. 25 to 168.7 per cent of the 1926 average after reaching a postwar peak the preceding week, according to Bureau of Labor Statistics. Another bureau index, the consumers' price index, rose 0.5 per cent in the period from July 15 to Aug. 15, reaching 174.5 per cent of the 1935-1939 average.

WAGES—Gross average weekly earnings for the 13.2 million production workers of the nation advanced to a new high of $53.86 in mid-August, according to estimates by Bureau of Labor Statistics. Continued gains in gross hourly earnings reflecting wage adjustments, particularly in durable goods industries, were largely responsible for the advance. Hourly earnings increased from 133.2 to 134.5 cents over the month.

MANUFACTURERS' SALES—Current level of manufacturers' sales is at $17.9 billion monthly, following an August rise of $1.5 billion. According to Commerce Department, the primary factor in the August rise was the pickup in many of the nondurable goods industries. Book value of manufacturers' inventories edged upward, bringing the total at the end of August to $30.4 billion.



Index (chart above): Week ended Oct. 2 (preliminary) 175 Previous Week 169 Month Ago 170 Year Ago 165

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	96.0	96.0	95.0	94.5
Electric Power Distributed (million kilowatt hours)	5,449	5,461	5,470	4,935
Bituminous Coal Production (daily av.—1000 tons)	1,973	1,983	2,036	2,049
Petroleum Production (daily av.—1000 bbl.)	5,350‡	5,343	5,531	5,208
Construction Volume (ENR—Unit $1,000,000)	$128.1	$146.8	$146.8	$166.8
Automobile and Truck Output (Ward's—number units)	120,065	98,394	101,879	101,608

* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons. ‡ Preliminary.

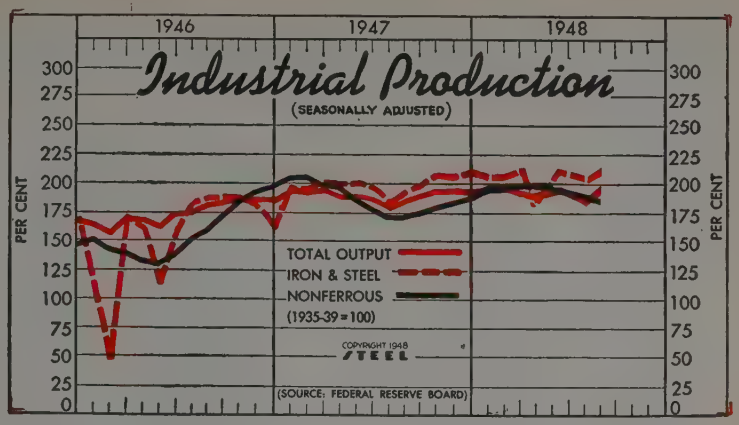
TRADE				
Freight Carloadings (unit—1000 cars)	900†	908	895	943
Business Failures (Dun & Bradstreet, number)	112	101	94	81
Money in Circulation (in millions of dollars)‡	$28,080	$28,083	$28,072	$28,559
Department Store Sales (changes from like wk. a yr. ago)‡	+1%	+12%	−8%	+23%

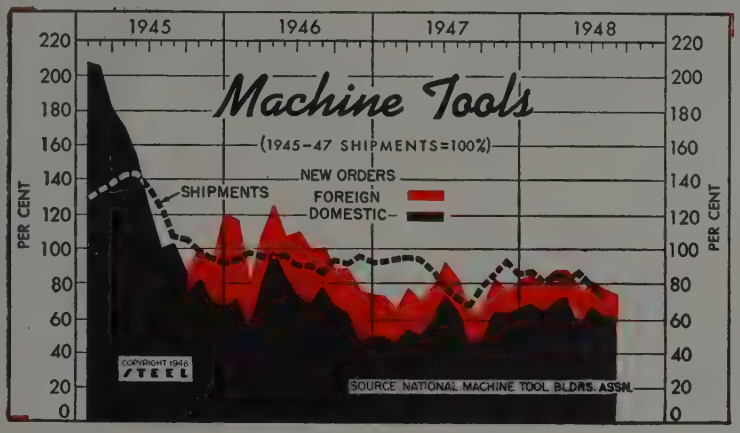
† Preliminary. ‡ Federal Reserve Board.

Federal Reserve Board's Production Indexes

(1935-39=100)

	Total Production		Iron, Steel		Nonferrous	
	1948	1947	1948	1947	1948	1947
Jan.	193	189	203	192	197	203
Feb.	194	189	203	191	197	208
Mar.	192	190	207	196	200	202
Apr.	188	187	177	195	198	197
May	191	185	206	197	197	187
June	192	184	207	193	193	179
July	186	176	200	181	185	171
Aug.	190	182	206	188	185	171
Sept.	...	186	...	195	...	174
Oct.	...	190	...	204	...	179
Nov.	...	192	...	202	...	185
Dec.	...	192	...	205	...	189
Ave.	...	187	...	195	...	186





Machine Tools

(1945-47 Shipments=100)

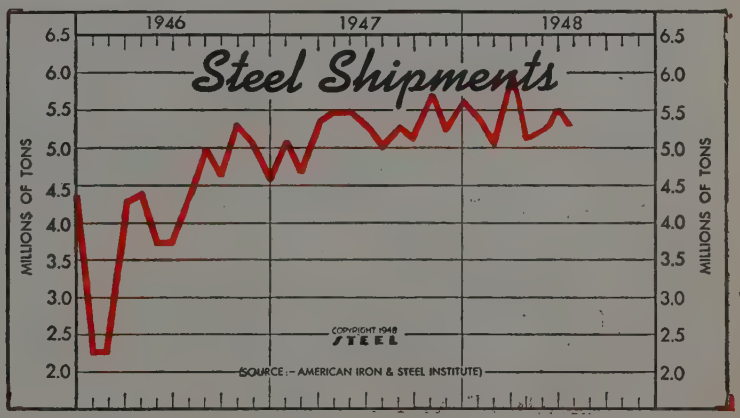
	Orders				Shipments (3 Mos. Ave. Centered)	
	Total		Domestic			
	1948	1947	1948	1947	1948	1947
Jan.	83.1	71.7	69.1	50.7	86.9	93.1
Feb.	77.3	63.8	64.6	48.0	81.9	94.8
Mar.	86.3	74.3	70.2	54.2	84.2	95.4
Apr.	86.3	69.8	72.2	51.0	82.7	94.3
May	73.5	76.9	62.1	60.6	86.3	88.9
June	83.4	90.9	71.5	73.7	79.9	79.5
July	74.0	81.1	61.1	64.4	75.3	71.0
Aug.	73.6	62.1	60.9	47.5	...	68.6
Sept.	...	...	63.7	...	49.0	...	78.5
Oct.	...	...	81.0	...	65.0	...	85.5
Nov.	...	...	75.6	...	64.1	...	92.6
Dec.	...	...	81.1	...	66.3	...	86.1

Steel Shipments

(Net Tons)

	1948	1947	1946
Jan.	5,410,438	5,061,333	2,189,369*
Feb.	5,046,115	4,626,424	2,189,368*
Mar.	5,978,551	5,304,415	4,213,913
Apr.	5,096,161	5,445,993	4,335,694
May	5,321,375	5,442,343	3,666,677
June	5,476,774	5,263,711	3,687,509
July	5,229,880	4,974,566	4,259,494
Aug.	.....	5,278,223	4,965,456
Sept.	.....	5,118,839	4,589,902
Oct.	.....	5,681,597	5,260,832
Nov.	.....	5,216,990	5,019,984
Dec.	.....	5,613,036	4,533,420

* Figures for January and February, 1946, are merely averages derived from a report that combined shipments for those two strike-affected months into a total of 4,378,737.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$14,007	$16,185	$12,341	$13,680
Federal Gross Debt (billions)	$252.3	$252.2	$253.1	$259.4
Bond Volume, NYSE (millions)	$17.7	$13.6	$14.0	$23.1
Stocks Sales, NYSE (thousands)	4,633	4,132	3,776	5,404
Loans and Investments (billions)†	$63.0	$63.7	$63.2	$64.6
United States Gov't. Obligations Held (millions)†	$33,921	$34,744	$34,702	$38,680

† Member banks, Federal Reserve System.

PRICES

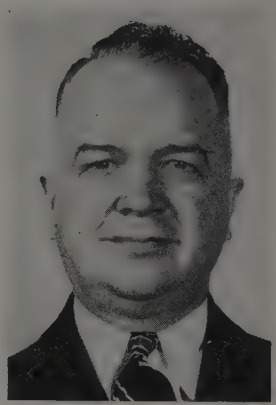
STEEL's composite finished steel price average	$95.05	$95.05	$95.05	$75.41
All Commodities†	168.7	169.2	168.4	156.2
Industrial Raw Materials†	182.4	182.0	181.7	171.1
Manufactured Products†	164.4	165.5	164.2	150.9

† Bureau of Labor Statistics Index, 1926 = 100.

Men of Industry

O. R. SCHROEDER

W. EDWARD VOKES



J. NORMAN QUINLAN

O. R. Schroeder has been appointed vice president of development and engineering, Weldaloy Products Co., Detroit. He formerly was director of metallurgical research, Great Lakes Steel Corp. He was actively instrumental in the development of resistant welding processes for special low alloy, high tensile and other alloy steels carried out in conjunction with the welding research laboratory located at Rensselaer Polytechnic Institute under the direction of **Dr. W. F. Hess.**

—o—

Charles P. Haskell has been appointed special engineering representative for Nelson Stud Welding Division, Morton-Gregory Corp.

—o—

H. A. Malcom has been appointed sales manager, Rusco Awning Division, F. C. Russell Co., Cleveland. He had been general sales manager, Airtemp Division, Chrysler Corp., and has served both Westinghouse Electrical Supply Co. and Frigidaire Division, General Motors Corp.

—o—

Walker-Turner Division, Kearney & Trecker Corp., Milwaukee, announces appointment of **V. Paul Yale** as district representative in charge of Michigan and Indiana.

—o—

Robert M. Honegger, general manager of the Buffalo plant, Farrel-Birmingham Co. Inc., Ansonia, Conn., has been elected a member of the board of directors. He entered the employ of the company in 1925 as a member of the engineering department. He has been manager at Buffalo since 1945.

—o—

George C. Trevorrow has been appointed general superintendent of coal mines, Wheeling Steel Corp., Wheeling, W. Va. He formerly held the position of manager of mines, Duquesne Light Co. Mr. Trevorrow will assume responsibility for operation of both Wheeling Steel and Consumers Mining Co. coal mines, in the department of raw materials, headed by **G. W. Hewitt,** assistant vice president.

—o—

W. Edward Vokes, purchasing agent for Goddard & Goddard Co., Detroit, has been elected president of the Purchasing Agents Association of Detroit for 1948-1949, succeeding **Marshall Pease Jr.,** purchasing agent of Detroit Edison Co. **Arthur D. Hummel,** purchasing agent, Frederic B. Stevens Inc., has been named first vice president; **Walter E. Murray,** purchasing agent, R. C. Mahon Co., has been named second vice president; and **Andrew DeCarlo,** purchasing agent, Carboloy Co., treasurer.

—o—

Marshall G. Munce has been elected a vice president, York Corp., York, Pa., assigned to represent top management in assisting and supporting the sales organization through trade relations and public relations activities. Associated with the firm since 1921, he was manager of the Washington sales office, following which he took an emergency assignment as managing director of the corporation's British subsidiary, York Shipley Ltd., London, Eng. Since returning to York in 1940, Mr. Munce has been assistant to the president, chiefly as co-ordinator between Engineering, Manufacturing and Sales Divisions, which activities were recently taken over by **J. Keith Louden,** formerly with Armstrong Cork Co., Lancaster, Pa.

—o—

Gary Works of Carnegie-Illinois Steel Corp., U. S. Steel Corp. subsidiary, announces the following executive personnel changes in its West Mills Division, metallurgical laboratory and inspection department: **J. Norman Quinlan** has been promoted from division superintendent of the West Mills to assistant to general superintendent of the plant. He has been associated with the plant since 1907, and a division superintendent for the last eight years. **Charles J. Hunter** succeeds Mr. Quinlan as division superintendent of the West Mills, and **Oscar Pearson** succeeds Mr. Hunter as chief metallurgist and inspector at the works. **Ragnar Overberg,** in turn, succeeds Mr. Pearson as assistant in steel production at Central Mills. Mr. Overberg, a native of Sweden, joined Gary Works in 1925, and has since progressed through various metallurgical and steel production executive positions.

—o—

R. R. Donaldson has been elected vice president in charge of engineering, Hagan Corp., Pittsburgh. He joined the company in 1918, and after serving in various positions with the company, became chief engineer last year.

—o—

Cooper-Bessemer Corp., Mt. Vernon, O., has added a branch office at Chicago, under the direction of **Robert S. Bowie,** associated with the company since 1936 in other sales capacities, and active in the Chicago area since 1946. Mr. Bowie will continue his activities under the supervision of **Charles L. White,** dis-

11 ~~10~~ REASONS

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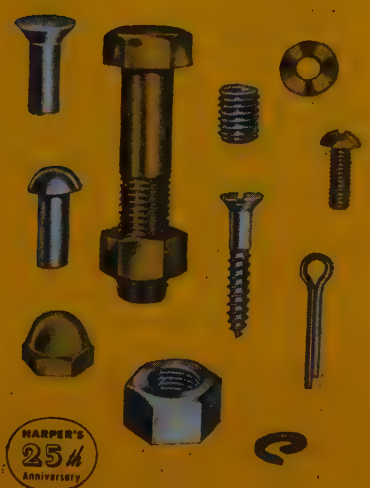
2. Resistance to High Temperatures
3. Non-Magnetic
4. Non-Sparking
5. Re-Usable
6. Attractive Appearance
7. Easy to Clean
8. High Strength
9. Long Life
10. Lower Ultimate Cost
11. Resistance to Fatigue

. . . Only one reason for using common steel– **(LOWER FIRST COST)**



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HARPER

trict manager for Cooper-Bessemer in the north-central area. The new office is located at 122 S. Michigan Ave.

—o—

Donald E. Nichols, vice president, Ames, Emerich & Co., investment bankers, Chicago, has been elected a director, Gerity - Michigan Corp., Adrian, Mich., to fill a vacancy on the board. He also is a director of Soss Mfg. Co., Detroit, and Aerovox Corp., New Bedford, Mass.

—o—

Reynolds Metals Co., Louisville, announces appointment of **Harry H. Armstrong** as a sales specialist assigned to the Chicago sales office, where he will concentrate on sales throughout the midwest of the new Alumi - Drome, the all - aluminum, arch-roof, self-supporting prefab developed by Reynolds.

—o—

Edward J. Lauth Jr., M. D., has been appointed medical supervisor of Dravo Corp. and its subsidiaries, Pittsburgh.

—o—

Main Belting Co., Philadelphia, manufacturer of transmission and conveyor belts, announces that **Karl S. Howard** is now a director of the company. He is also vice president, General Steel Castings Corp., Eddystone, Pa.

—o—

Alan S. Landay has joined M. N. Landay Co., Pittsburgh, broker in scrap iron and steel, and will be associated with the company's purchasing department, with particular attention to electric furnace and alloy steel scrap. He recently completed his studies at Carnegie Institute of Technology, where he majored in metallurgy and engineering.

—o—

Edward W. Lang, chemical engineer, Southern Research Institute, Birmingham, has resigned that position to join the research department of Sloss-Sheffield Steel & Iron Co.

—o—

William D. Moss has been appointed traffic manager, Eaton Mfg. Co., Cleveland, and will act in an advisory capacity for all of the Eaton divisions on matters of handling the transportation of goods, both incoming and outgoing. He formerly was assistant traffic manager for Montgomery Ward & Co. in its New York office.

—o—

Atlas Chain & Mfg. Co., Philadelphia, announces appointment of **O. W. Schmidt** as its central states district sales manager. He formerly was sales manager, Shafer Bearing Co., Downers Grove, Ill. He will maintain offices in Chicago.

—o—

G. O. Romig has been appointed sales manager, Cleveland plant, Claud S. Gordon Co. He joined the company as sales engineer in 1945.

—o—

Willard Storage Battery Co., Cleveland, announces the promotion of **L. G. DeMotte** to the position of southeastern district sales manager, succeeding the late **R. B. Hutchison.** He has been serving as assistant sales manager at the company's main office in Cleveland.

—o—

Arthur B. Van Buskirk, vice president and a member of the board of governors, T. Mellon & Sons, has been elected a member of the board of directors, Koppers Co. Inc., Pittsburgh. He succeeds **Donald D. Shepard** of Washington, who recently resigned.

—o—

Walter C. Trautman has been appointed chief engineer of the Racine, Wis., operations of Walker Mfg. Co., in charge of the company's engineering on its line of automobile jacks, lifts, oil filters, and exhaust system pipes. He recently joined the company as chief engineer of the Hydraulic Division. He previously had been director of engineering, Pacific Division, Bendix Aviation Corp.

—o—

M. J. Boho has been elected vice president in charge of sales, Hagan Corp., Pittsburgh, combustion control and flow meter manufacturer. He joined the company as a field service engineer in 1936 after serving as a research engineer in private industry and with the Potomac Electric Power Co., Washington. In 1938 he was transferred to Hagan's New Projects Division, where he was engaged in the development, design and application of automatic combustion controls for steel industry use. In 1945 he was appointed assistant general manager of sales.

M. J. BOHO

—o—

Dr. A. K. Wright, chief radio engineer, Tungsol Lamp Works Inc., Bloomfield, N. J., has been appointed a member of the Joint Electron Tube Engineering Council, which is sponsored by Radio Manufacturers Association and the National Electrical Manufacturers Association. **Frank Langstroth,** Lansdale Tube Co., has been appointed chairman of the council's receiving tube committee.

—o—

A. K. Wing Jr., Federal Telecommunication Laboratories Inc., has been appointed chairman of the high vacuum tube power committee.

—o—

Wilson S. Isherwood, general sales manager, AC Spark Plug Division, General Motors Corp., Detroit, has resigned and is succeeded by **John C. Hines.** Mr. Isherwood joined the organization in 1914, six years after its founding.

—o—

Whitcomb Locomotive Co., subsidiary, Baldwin Locomotive Works, Philadelphia, has elected **Roland C. Disney** as vice president and general manager. Mr. Disney has been associated with Baldwin Locomotive Works as assistant to the vice president, Eddystone Division.

—o—

Laurence F. Kedzie has been appointed assistant director of purchases, and **Jack A. Faulkner,** purchasing agent, Bendix Home Appliances Inc., South Bend, Ind.

—o—

H. F. R. Weber has been appointed by Link-Belt Co., Chicago, as representative of the company to the pulp and paper industry. His headquarters will be at Chicago.

—o—

Dick W. Jennings has been named assistant general manager, Greer Steel Co., Dover, O. He was formerly associated with American Steel & Wire Co. at Cleveland.

—o—

James O. Rice has been elected secretary, American Management Association, New York, succeeding **Henry J. Howlett,** recently resigned.

—o—

Ronald B. Smith has joined M. W. Kellogg Co., New York, on the engineering staff. His special fields include gas turbines, superchargers, condensers, oxygen plants and power machinery in general. In addition to membership in technical organizations, Mr. Smith is a consultant to

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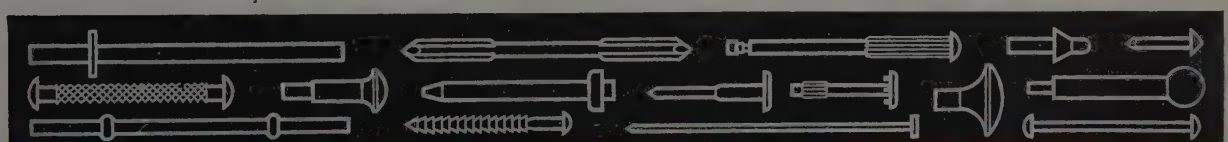


JOHN HASSALL, INC. • OAKLAND AND CLAY STREETS • BROOKLYN 22, N. Y.

the Atomic Energy Commission and a member of the National Advisory Committee for Aeronautics.

—o—

Timothy E. Shea, assistant engineer of manufacture, Western Electric Co. Inc., New York, has been elected president and a director of Teletype Corp., succeeding the late **Clem H. Franks** as head of this subsidiary of Western Electric.

—o—

Jack R. Koske has been appointed to the board of regional sales supervisors, Eutectic Welding Alloys Corp., New York, in charge of the east central section of the United States. He formerly served as a field engineer. **Paul E. Miller** has been appointed regional sales supervisor in the mid-east section of the United States. He also served as a field engineer.

—o—

Earl S. Reynolds has been appointed director of public relations in Southern California for Kaiser Co. Inc. He has been in public relations work for many years in the West, and has held various positions with the Kaiser interests, the last of which was manager of fleet sales in Southern California for Kaiser-Frazer Corp. His headquarters will be at the Fontana, Calif., plant.

—o—

Mark T. Anthony has been appointed assistant to the vice president and general manager of Kaiser Co. Inc., Iron & Steel Division, Oakland, Calif. He has been with Kaiser Co. Inc. for the past three years in the Cost & Commercial Planning Division.

—o—

B. F. Bilsland has been promoted from manager of the Chicago district, Allis-Chalmers Mfg. Co., to manager of the company's newly formed midwest region. He has been associated with Allis-Chalmers since 1919, and has been manager of the Chicago district for the last 15 years. He continues to make his headquarters in Chicago. **J. C. Collier,** employed by the company since 1916, and since 1929 in the Chicago office, succeeds Mr. Bilsland as manager of that district.

—o—

Robert M. Conley, assistant plant superintendent since 1939, Pittsburgh Plate Glass Co.'s plate glass producing plant at Crystal City, Mo., has been appointed superintendent, succeeding **George W. Oakes,** resigned. **B. H. Greenop** has been appointed to succeed Mr. Conley.

—o—

Herbert H. Rogge, vice president, Westinghouse Electric Corp., and

WALLACE F. ARDUSSI

Has purchased Variety Machine & Stamping Co., Cleveland. Noted in STEEL, October 4 issue, p. 68

Frank M. Folsom, executive vice president, Radio Corp. of America, were elected chairman of the board and president, respectively, of the Navy Industrial Association.

—o—

Streeter-Amet Co., Chicago, announces that **Harry K. Franklin,** service manager of its Chicago office, has been appointed branch manager of its Pittsburgh office. In addition to his new duties, he will continue with complete control of service and maintenance from the Pittsburgh office.

—o—

Owen Rice, former manager, threshold department, Calgon Inc., Pittsburgh, has been elected vice president in charge of commercial chemical sales of Calgon Inc., subsidiary of Hagan Corp.

—o—

Agaloy Tubing Co., Springfield, O., announces the appointment of **I. F. Pohlmeyer,** 170 S. Beverly Hills, Los Angeles, as its representative in Southern California.

—o—

Barney D. McCarthy, formerly assistant district manager, Republic Steel Corp., Youngstown, has joined Blocked Iron Corp., Albany, N. Y., as vice president, and will deal with the development of agglomerated open hearth feed and charge ores.

—o—

Harry E. Seim has been appointed general manager, Sturtevant Division, Boston, and **Tom Turner** as general manager of the Elevator Division, Jersey City, N. J., Westinghouse Electric Corp. Both men will retain their former posts in addition to assuming their new duties. Mr. Seim, vice president and general manager, Bryant Electric Co., subsidiary, will continue to make his headquarters at Bridgeport, Conn. Mr. Turner will have his office in the Elevator Division plant, but will retain his position as general manager, Westinghouse Meter Division, Newark, N. J. Mr. Seim and Mr. Turner succeed **Ellis L. Spray,** vice president in charge of the Elevator & Sturtevant Divisions, who has retired.

—o—

Tom J. Smith Jr., president, Pressed Metal Institute, Cleveland, has resigned after serving the institute for the past five years. Until such time as the vacancy created by Mr. Smith's resignation has been filled, the administration will be directed by the vice president with the advice and guidance of the executive committee.

—o—

Don M. Tatem has been appointed manager of the Kansas City district, B. F. Goodrich Co., Akron, succeeding **W. A. Olson.** Mr. Tatem has been manager of the Birmingham district since it was created three and one-half years ago. **Charles S. Millikin** has been named manager of the Birmingham district, succeeding Mr. Tatem.

—o—

E. W. Butzler, a member of the staff of Hall Laboratories Inc., Pittsburgh, has been appointed to the new position of business manager of the firm. In 1938 Hall Laboratories' parent firm, Hagan Corp., assigned Mr. Butzler to service as consulting engineer for Hagan & Hall, clients in the Pittsburgh area. For many years he has been working with **Dr. R. E. Hall,** director of Hall Laboratories.

—o—

William Burnett, chief experimental engineer, Ford Motor Co., Dearborn, Mich., has been appointed assistant chief engineer for Ford passenger cars. He joined Ford in 1946 after 17 years with the Cadillac Motor Car Co.

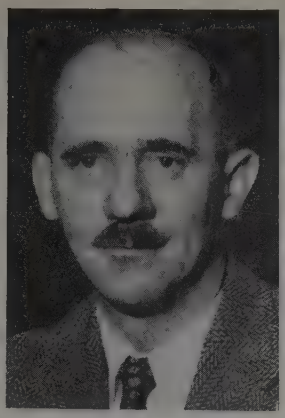
—o—

Federated Metals Division, American Smelting & Refining Co., New York, announces that **A. M. Callis,** former sales manager of its Chicago territory, has been appointed to the newly created post of general sales manager. Other transfers announced at the same time are: **J. W. Kelin,** former sales manager, St. Louis, succeeds Mr. Callis, and **Paul H. Jackson** succeeds Mr. Kelin at St. Louis. He was district sales manager at Seattle.

—o—

Richard Rieger, service manager for automotive and engine manufacturers, and proprietor of repair shops and garages in Chicago since 1926,

W. F. GODEJOHN
Appointed assistant to the president, Harbison-Walker Refractories Co., Pittsburgh. Noted in STEEL, Oct. 4 issue, p. 71



STANISLAW T. JAZWINSKI
Elected operating vice president, Detroit Steel Casting Co., subsidiary, Barium Steel Corp. Noted in STEEL, Oct. 4 issue, p. 71

SAMUEL M. GAHAGEN
Has been appointed chief metallurgist by Jessop Steel Co., Washington, Pa. Noted in STEEL, Oct. 4 issue, p. 68

has joined the Chicago office of Yale & Towne Mfg. Co., Philadelphia Division, as branch service manager. He will supervise the care of electric trucks, hand trucks, scales, and material handling systems installed by Yale & Towne Mfg. Co. in the Chicago area.

—o—

Braeburn Alloy Steel Corp., Braeburn, Pa., announces the appointment of **Charles W. Schuck** as general superintendent of its plant at Braeburn. Mr. Schuck, who received his education at the University of Pittsburgh, has served the company in the last eight years as metallurgist in charge of quality control.

OBITUARIES . . .

Carroll D. Hepler, 43, general manager, construction materials department, General Electric Co., at Bridgeport, Conn., died of a cerebral hemorrhage during a routine visit to the company's factory in New Kensington, Pa. Formerly vice president in charge of marketing, Trumbull Electric Mfg. Co., a G-E affiliate, he was appointed head of the construction materials department when it was formed in May.

—o—

Daniel E. Miller, 59, director of purchases, Carborundum Co., Niagara Falls, N. Y., died suddenly of a heart attack. He joined Carborundum in April of this year.

—o—

Frank P. Harris, 81, former assistant superintendent, Erie Forge & Steel Co., Erie, Pa., died recently. He retired from the forge company 13 years ago.

—o—

Donald Van de Water Jenkins, 65, vice president and director, Watson Elevator Co. Inc., New York, died recently.

—o—

James B. Bailey, 80, president, Pine Iron Works Co., Pine Forge, Pa., died at his home in Bryn Mawr, Pa.

—o—

Arthur A. Nelson, 62, former assistant general sales manager, Keystone Steel & Wire Co., Peoria, Ill., died Oct. 4 in Wausau, Wis. He had retired in June, 1947, after 41 years' continuous association with the company.

—o—

Vaughn E. Montgomery, 57, president, V. E. Montgomery Co., coal dealer and former pig iron broker, died suddenly in his Cincinnati office, Sept. 27.

—o—

Dr. William R. Work, 67, assistant director of the College of Engineering & Science, Carnegie Institute of Technology, died Oct. 3.

—o—

Thomas E. Miller, vice president and director, Shaw-Walker Co., Muskegon, Mich., died in Montclair, N. J., Sept. 21 after a short illness.

—o—

Clare L. Brackett, 61, president, National Machine Products Co., Detroit, died in that city Oct. 4.

—o—

James T. Neal, 61, assistant secretary-treasurer, National Supply Co., Pittsburgh, died in Tulsa, Okla., Sept. 23 following a heart attack. He had been with the company 41 years, most of which were spent in Oklahoma.

—o—

Thomas F. Maher, 82, president, Jamestown Iron Works Inc., Jamestown, N. Y., died Oct. 1 following a week's illness.

—o—

George D. Crabbs, retired chairman of the board, Philip Carey Mfg. Co., Cincinnati, died in Harrisonburg, Va., Sept. 29. He had been president of the company 42 years before becoming board chairman. Mr. Crabbs was one of the founders of National Association of Manufacturers in 1895.

—o—

George A. Blackmore, 64, chairman of the board and chief executive officer of Westinghouse Air Brake Co., Wilmerding, Pa., and the Union Switch & Signal Co., Swissvale, Pa., died Oct. 2 in Pittsburgh. He was chairman of the board, Duff-Norton Mfg. Co., and a director in numerous other companies.

—o—

Thomas B. Stillman, 58, engineering consultant for Babcock & Wilcox Co., New York, died recently in Philadelphia.

—o—

David Strauss, 78, chairman of the board, Continental Iron & Steel Co., New York, died recently.

—o—

Augustine L. Kelly, retired owner of Kelly Forging Co., Watervliet, N. Y., died recently. He taught iron and steel forging at Rensselaer Polytechnic Institute.

—o—

Morris Katz, 60, vice president and assistant treasurer, American Steel & Iron Co., Boston, died Sept. 30.

—o—

Herbert F. Lindsay, 64, vice president, Lindsay Bros. Inc., Milwaukee, agricultural implement firm, died Oct. 3.

And they doubled production—

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HOW WOULD you like to see:

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Engineering News . . . AT A GLANCE

ANALYZES METAL "SLICES"—Skin condition of bronze castings now can be studied by a method that involves "slicing" and x-raying thin pieces of metal ⅛-inch thick, according to *Non Destructive Testing*. The technique, which is suitable more for development work than for production control, is employed in conjunction with x-ray equipment operating in low voltage range. Resulting exographs are said to reveal a strikingly different condition at the surface of a casting, compared to center portions. Success of the method depends principally on the employment of thin slices—cut out through the full cross section of the casting—which afford greater sensitivity than attained in ordinary radiography.

PUTS OUT MORE WORK— Conversion of a power press from a forming unit into a complete production machine that blanks and forms crimped gutters in one operation was instrumental in increasing production by some 118 per cent in the plant of Southern States Iron Roofing Co. According to the Savannah, Ga., concern, change-over was made by using a newly designed progressive-type die. In the setup, blanking part of the die is positioned forward of the forming section of the machine and raised slightly above it. On downward stroke of the press a 2½ x 9-inch blank is cut at the same time the forming section of the die forms at a 45-degree angle the blank cut during the preceding stroke. Formed gutter is ejected automatically at the rear of the press.

INSURES ACCURACY—Because of its diffusing properties, translucent Plexiglas manufactured by Rohm & Haas Co., Philadelphia, is now being employed by General Electric X-Ray Corp. on its radiograph illuminators—to provide evenly diffused light necessary for accurate interpretation of radiographs of castings and weldments. GE uses the acrylic plastic in form of ⅛-inch sheets measuring 14 x 17 inches.

ADDED ASSEMBLY-LINE AID— Roadability gage capable of aligning front wheels of more than 500 cars every 8-hour shift is now employed on all final assembly lines of Ford Motor Co.'s plants. Invented by Edwin Pleasance, chief tool engineer for Lincoln-Mercury divisions, and made by Standard Tool Co., Detroit, the gage compensates for either toe-in or toe-out positions that front wheels describe when a car is in motion. In operation, gage rotates front wheels at a speed of 30 miles per hour, spherical drums that are dynamically balanced, bearing the full weight of the front of the vehicle in a straight ahead position. Aligning is done by an instrument-aided operator stationed in a pit under the gage.

ULTRASONIC PAINT PEELER— Wearing qualities of synthetic paints now can be tested in less than 1 second with a new machine that utilizes ultrasonic force, Saul Moses of the Naval Research Laboratory, revealed before the 114th national meeting of the American Chemical Society. New method is said to show great promise of providing necessary experimental technique for effective study of how and why, and how much organic coatings adhere to metals. Coating is tested by smearing it on a metal cap screwed on the end of a duraluminum cylinder. Latter is connected to an electronic device that generates high-frequency waves. When current is turned on cylinder vibrates violently thousands of times per second, shaking loose the coating. Vibration force needed to make the paint peel is easily calculated, indicating how long the coating can be expected to last.

NOT LIMITED TO BAINITE—Usefulness of isothermal heat treatment is by no means limited to transformation to bainite, it is pointed out. Isothermal transformation to pearlite also represents a wide field of usefulness, particularly in relation to annealing. In the isothermal method, steel is cooled as rapidly as desired, or if practical, to the transformation temperature corresponding to the desired coarse pearlite microstructure held there long enough to permit complete transformation, then again cooled as rapidly as desired to room temperature. Such a cycle may result in considerable saving in time compared to the conventional method. (p. 92)

"ARMOR" FOR METALS — Selection of hard facing as an engineering technique is strongly influenced by the need for "armoring" a part against severe service. If superficial protection alone is required, a manufacturer can resort to a case hardening process. If, however, an "armor" from 1/32 to 3/8-inch thick is needed, hard surfacing is the preferred choice. Hard facing is reputed to increase life of parts from 2 to 25 times. A steel plant, for example, increased the life of guides for a 15-inch rolling mill from an average of 600 billets for chilled iron to an average of 150,000 billets per set of guides hard surfaced with martensitic cast iron. (p. 96)

"LEAD PROOF"—Much precaution is exercised in forging plants in regard to inspecting the end product and "tools" used to produce them. Die inspection, for example, is an important routine check in all die production forging plants to insure correct shape with proper sizes to the forging. Before using a new set of impression dies proof that the shape is accurate actually is furnished the user in lead. To supply the "lead proof" dies are clamped together in correct relation to each other and a die metal, usually some alloy of lead is poured into the finishing impression through the gate and sprue. After the lead casting solidifies, it is removed, inspected and forwarded to the user for approval. (p. 101)

News Summary—p. 61 *Market Summary—p. 137*

Isothermal Heat Treatment

. . . precision method of obtaining exact microstructure desired for a particular application

By J. M. HODGE
Research and Development Div.
Carnegie-Illinois Steel Corp.
Pittsburgh

SCIENTIFIC heat treatment is aimed at obtaining the specific microstructure which corresponds to the most desirable properties of a steel for a particular application. Such an approach has been made possible largely through the pioneering work of such metallurgists as Bain and Davenport and their many followers on the isothermal transformation of austenite at subcritical temperatures.

With the exception of austempering, this knowledge has, until fairly recently, been applied principally to the conventional heat treating processes which involve continuous cooling rather than to isothermal transformation. The tremendously important concept of hardenability and the realization of its wide significance represents one such application. Isothermal heat treatment, in which transformation ideally occurs at a single temperature to the exact microstructure desired, however, permits a direct application of these principles to a precision heat treatment to the specific microstructure desired for a particular application.

In a steel of the 8640 type, and in general in hypoeutectoid steels, transformation occurring at temperatures of from 1300 to 1000°F is to ferrite and pearlite. As the transformation temperature decreases, the pearlite lamellae become more closely spaced and are irresolvable at 1050°F. This is a characteristic feature of pearlite and is very significant in relation to mechanical properties.

At temperatures between 1000°F and the temperature at which transformation to martensite begins (650°F in 8640 type steel), transformation is to bainitic microstructures. At temperatures below the bainite range, transformation is to martensite. This transformation differs from those to pearlite or bainite in that it is not isothermal, but occurs, to a certain percentage, almost instantly on cooling to a given temperature. This martensite transformation behavior is characteristic of all steels, although the temperature range of martensite transformation will vary

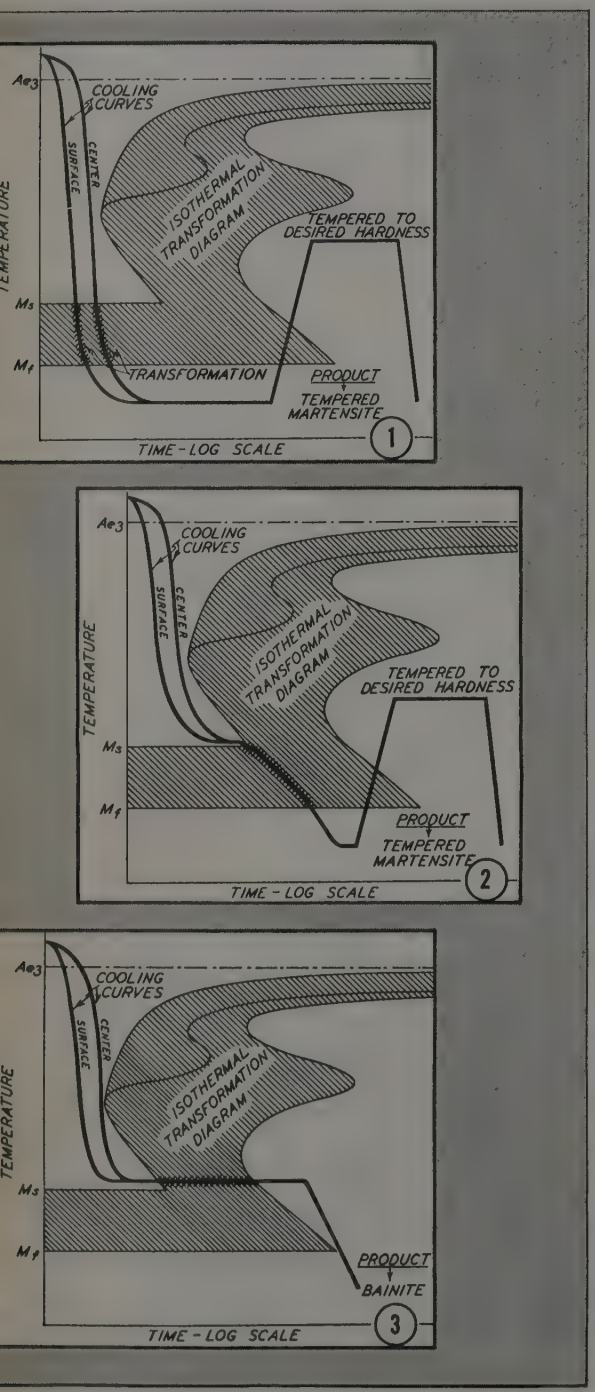


Fig. 1—Schematic transformation diagram for conventional quenching and tempering
Fig. 2—Schematic transformation diagram for martempering
Fig. 3—Schematic transformation diagram for austempering

with the composition. Because of this characteristic nature of the martensite transformation, heat treatment to martensite always invcIves continuous cooling through the martensite transformation range.

Hardness Values Increase—Hardness values of the various microstructures increase as the transformation temperature decreascs,, and this is a characteristic behavior. The markedly higher hardness of fine pearlite formed at 1100°F as compared with coarse pearlite as formed at 1250°F or of lower bainite, formed at 700 compared with upper bainite at 900 is noteworthy. This superiority of fine pearlite and lower bainite is important for applications in which these higher strengths are desired.

These microstructural changes are also reflected in variations in ductility. Martensite itself is the hardest and likewise the most brittle. Tempered martensite, on the other hand, is very tough and is the microstructure ordinarily desired in the conventional quench and temper heat treatment for optimum properties in respect to strength and ductility. Properties of lower bainitic microstructures are, however, quite comparable to tempered martensite and in some cases may be superior in ductility at high hardness. Fine pearlite microstructures formed at the lower temperatures are both harder and more ductile than the higher temperature pearlites and this is of importance for many applications.

It should be pointed out that the ductility of either tempered martensite or lower bainite is adversely affected by the admixture of higher temperature transformation products such as pearlite or upper bainite, and this may be quite serious if any considerable amount of such products is present.

The conventional heat treatment to tempered martensite, although it permits the attainment of optimum properties in respect to strength and ductility if properly carried out so that tempered martensitic microstructures are obtained, has several inherent disadvantages. The transformation to martensite, occurring during the rapid cooling through the martensite temperature range, sets up high stresses. These are augmented by the fact that there is a large temperature gradient through the cross section of the piece being quenched, so that the martensite formation occurs at different times in different portions of the cross section. Stresses may be high enough to

Fig. 5—*Schematic transformation diagram for conventional annealing*

Fig. 6—*Schematic transformation diagram for isothermal annealing*

Fig. 7—*Schematic transformation diagram for normalizing*

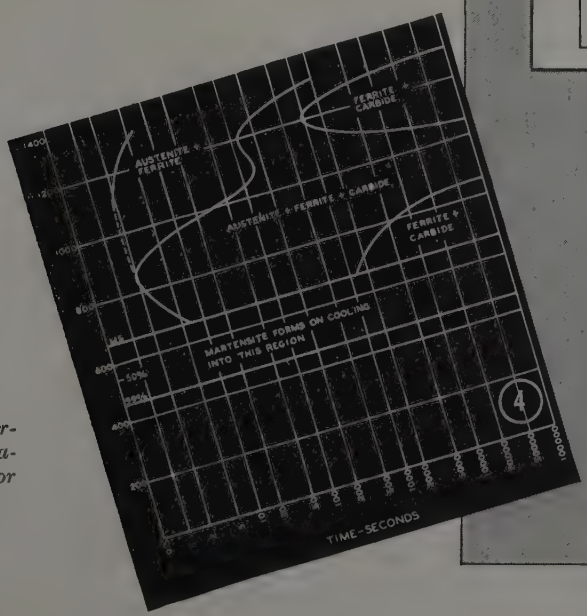
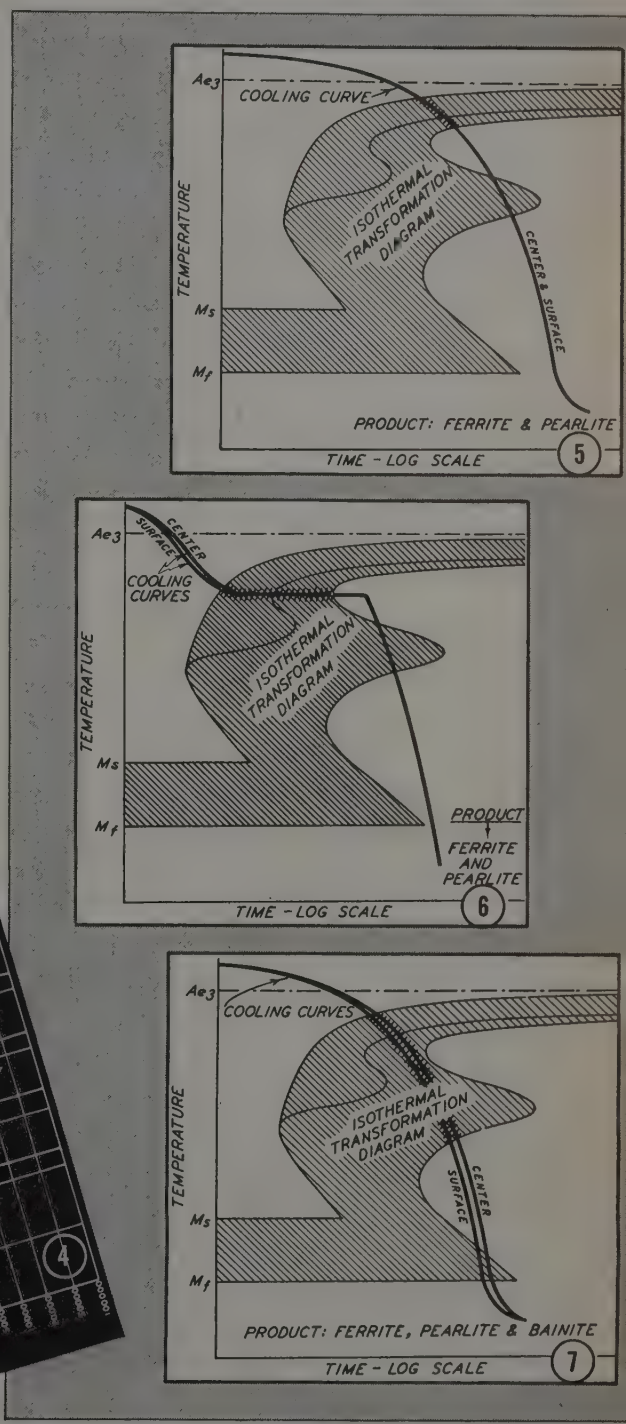


Fig. 4 — *Isothermal transformation diagram for an* 8640 *steel*



cause microcracks or even gross cracking and may also result in serious distortion during the heat treating cycle.

Martempering—Some of these disadvantages may, to a considerable extent, be overcome by the method of heat treatment known as martempering, which was developed by B. F. Shepherd. In practice it is ordinarily carried out by quenching the piece in a molten salt bath at a temperature just above the M_s temperature, holding in this bath long enough to permit the piece to become equalized throughout the cross section at this temperature and then air cooling to room temperature.

Transformation to martensite then occurs during the relatively slow air cooling and since the temperature gradient characteristic of the conventional method is absent, stresses set up by the transformation are much lower than in conventional quenching and tempering. After martempering, the piece may be tempered to the desired strength level.

Austempering—Austempering, on the other hand, offers an isothermal heat treatment which can be used alternatively with quenching and tempering or martempering. Austempering is an isothermal heat treatment to bainite and microstructures of lower bainite are generally comparable to tempered martensite in respect to strength and ductility.

This treatment consists of quenching to the desired temperature in the lower bainite region, usually in molten salt, and holding at this temperature until transformation is complete. The piece may be quenched or air cooled to room temperature after the transformation process has been completed.

Usefulness of isothermal heat treatment is by no means limited to transformation to bainite. Isothermal transformation to pearlite also represents a very wide field of usefulness, particularly in relation to annealing.

Conventional full annealing consists of austenitizing at a relatively high temperature so that full carbide solution is obtained, followed by slow cooling so that transformation occurs only and completely in the high temperature end of the pearlite transformation temperature range.

Annealing—In the corresponding isothermal heat treatment, the steel is cooled as rapidly as may be desired, or if practical, to the transformation temperature corresponding to the desired coarse pearlite microstructure, held at this temperature long enough to permit complete transformation, and then again cooled as rapidly as may be desired to room temperature. Such an isothermal annealing cycle may make possible a very considerable saving in time as compared to the conventional method. It also has the advantage common to isothermal heat treatments, that the precise pearlitic microstructure desired, rather than a compromise mixed microstructure, can be obtained.

Pearlitic microstructures are too hard for optimum machinability in the higher carbon steels and these steels, are, therefore, usually annealed to spheroidized microstructures. It has been found, however, that the procedures described can, with some modifications, be applied to annealing to spheroidite. By austenitizing at a relatively low temperature, and holding at a temperature in the upper part of the pearlite transformation range, the higher carbon steels may be transformed directly to spheroidite. An austenitizing temperature of about 100°F above the lower critical temperature on heating is ordinarily recommended for this purpose. It has also been found useful in some cases to obtain a preliminary spheroidization of some of the carbides by holding for a short time at a temperature just below the (*Please turn to Page* 112)

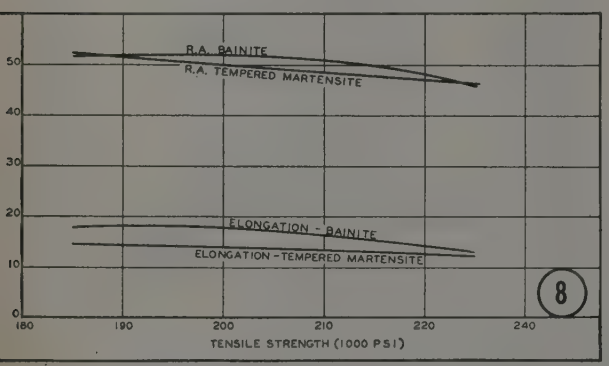
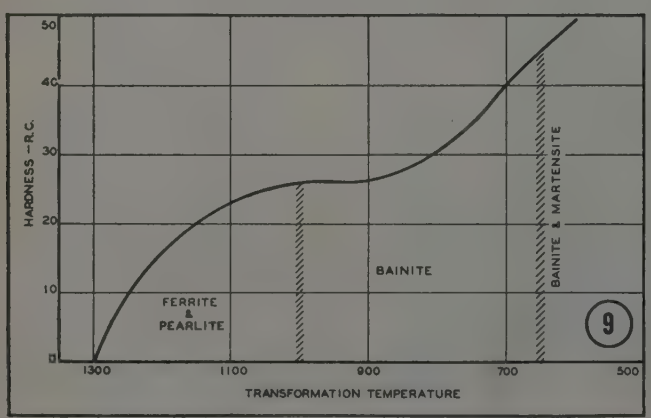
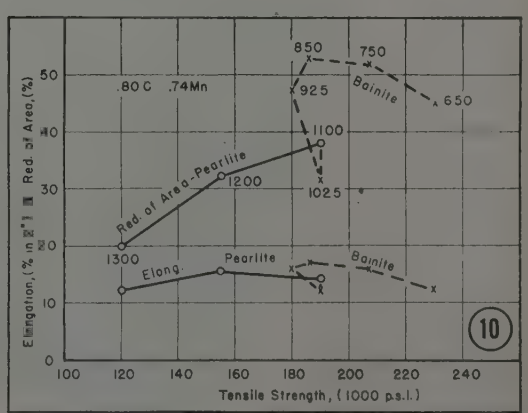


Fig. 8—Comparative mechanical properties of bainite and tempered martensite

Fig. 9—Hardness of 8640 steel as a function of transformation temperature

Fig. 10—Mechanical properties of pearlite and bainite (Gensamer)





Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

OLDACRE ON COOLANTS: One of the projects recently completed by the Market Research Department of STEEL is an analysis of distribution and use of cutting oils and compounds used in production machining. This is based on "balanced sampling" of 2000 of 16,459 production machine shops in the United States.

While we ourselves did not attempt to interpret the significance of interesting facts disclosed by this survey, several experienced people in the oil business have drawn interesting conclusions. One of these men is my good friend, William H. Oldacre, president, D. A. Stuart Oil Co., Chicago.

Referring to our figures on trends in the use of straight oils and water emulsions, Mr. Oldacre says: "There has been an increase in the use of water mixtures and emulsions due—I believe—to increased use of carbide tooling as well as recent emphasis on these water mixtures. However, I am surprised at the result shown by a rough analysis of your comparative figures.

"Assuming that 9,000,000 gallons of water-mixed oil (1947) was mixed on a ratio of 15 to 1 (an average mixture), we would have approximately 135,000,000 gallons of the mixture in our machines. Incidentally, only a small amount of this water-mixed oil is reclaimed.

"The 15,000,000 gallons of straight oil employed in the same period was—on the part of large users at least—subject to reclamation for reuse. If we assume that 10,000,000 of this 15,000,000 gallons was employed in plants having reclamation systems, and that 85 per cent was reclaimed in each cycle, this would indicate that approximately 72,000,000 gallons of straight cutting oil were used in 1947 as compared to the 135,000,000 gallons of water mixture. This is a much larger proportion of straight oil than ordinarily is pictured.

"In indicating that a grand total of about 25,000,000 gallons of cutting oil were used by American industry in 1947, your survey also can be given significant interpretation in connection with the tax picture. I want to point out that there is a 6 cents per gallon excise tax on these products. Hence it follows that Uncle Sam collected about $1,500,000 on that 1947 consumption. $1,500,000 may not mean a lot to our multi-billion dollar government. To businessmen like us, however, a million-and-a-half dollars still is a lot of money."

As indicated in the second paragraph of this item STEEL's presentation of special reports such as this on cutting oils is suggestive rather than interpretive. Our main object is to reveal trends which will enable men of industry to pattern their sales efforts for most effective riding of favorable economic waves or to counteract unfavorable trends by means of new products and through educational methods.

In my estimation, Mr. Oldacre is making a very real contribution to the cause of private enterprise when he calls attention to the big contribution made to the United States Treasury because of heavy taxation on cutting oil—which literally is the "life blood" of the production metalworking industry.

FOUNDRY MAN IN DRAFTING ROOM: One of the participants in the Conference on Creative Design held at the Cleveland Engineering Society on October 4, was George R. Morin, chief sales engineer, Jones & Lamson Machine Co., Springfield, Vermont.

Speaking from his 35 years experience which began with a machinist apprenticeship, Mr. Morin dealt with the practical phases of "Engineering an Idea for Production"—the "idea" naturally being a new model machine tool.

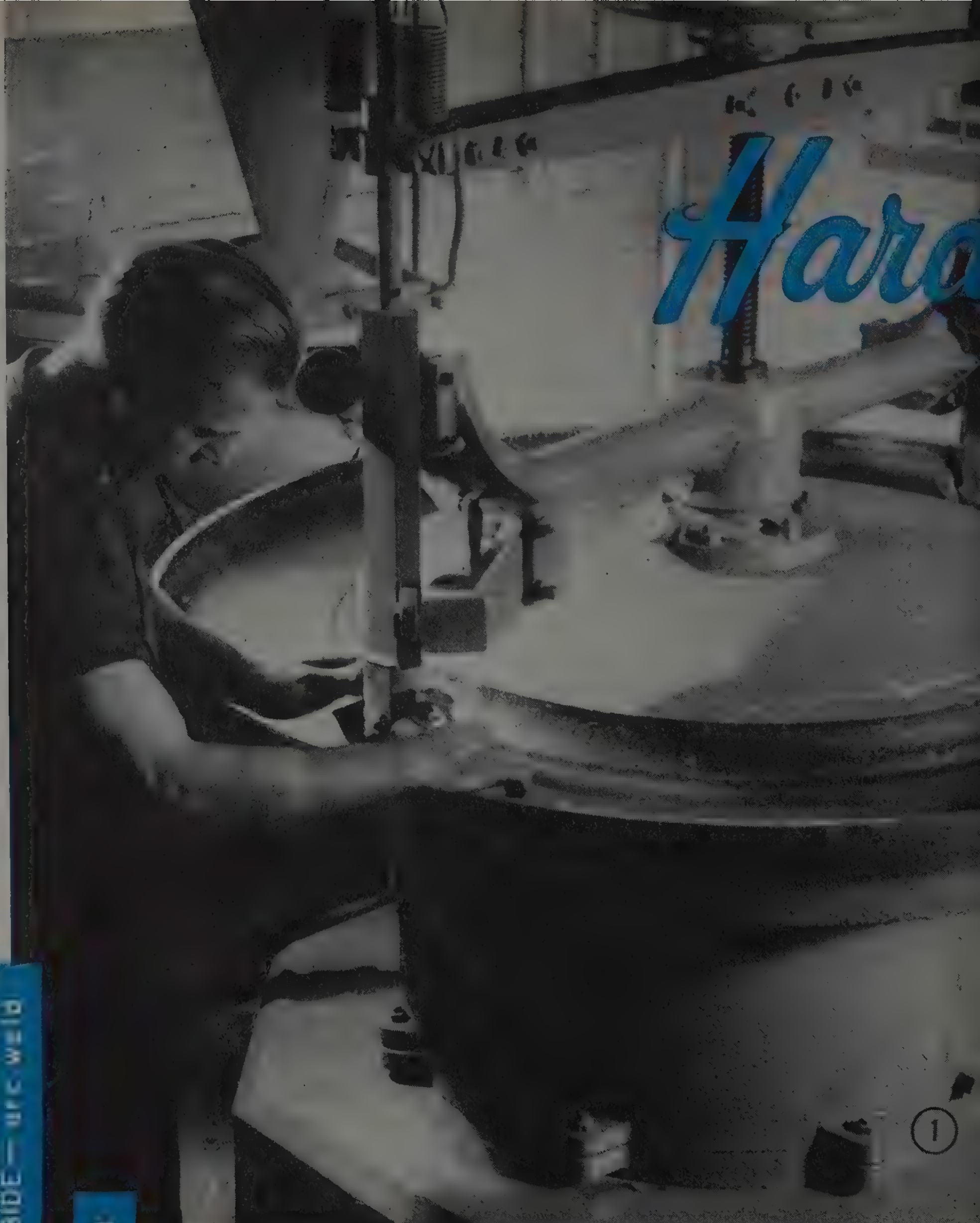
In this connection he brought out the fact that one of the men in the engineering department of his company is a "foundry engineer"—a graduate mechanical engineer with broad foundry experience. This man's duties not only include that of "go-between" from shop to patternshop and foundry, but also as interpreter of foundry facts of life to the design engineers and draftsmen.

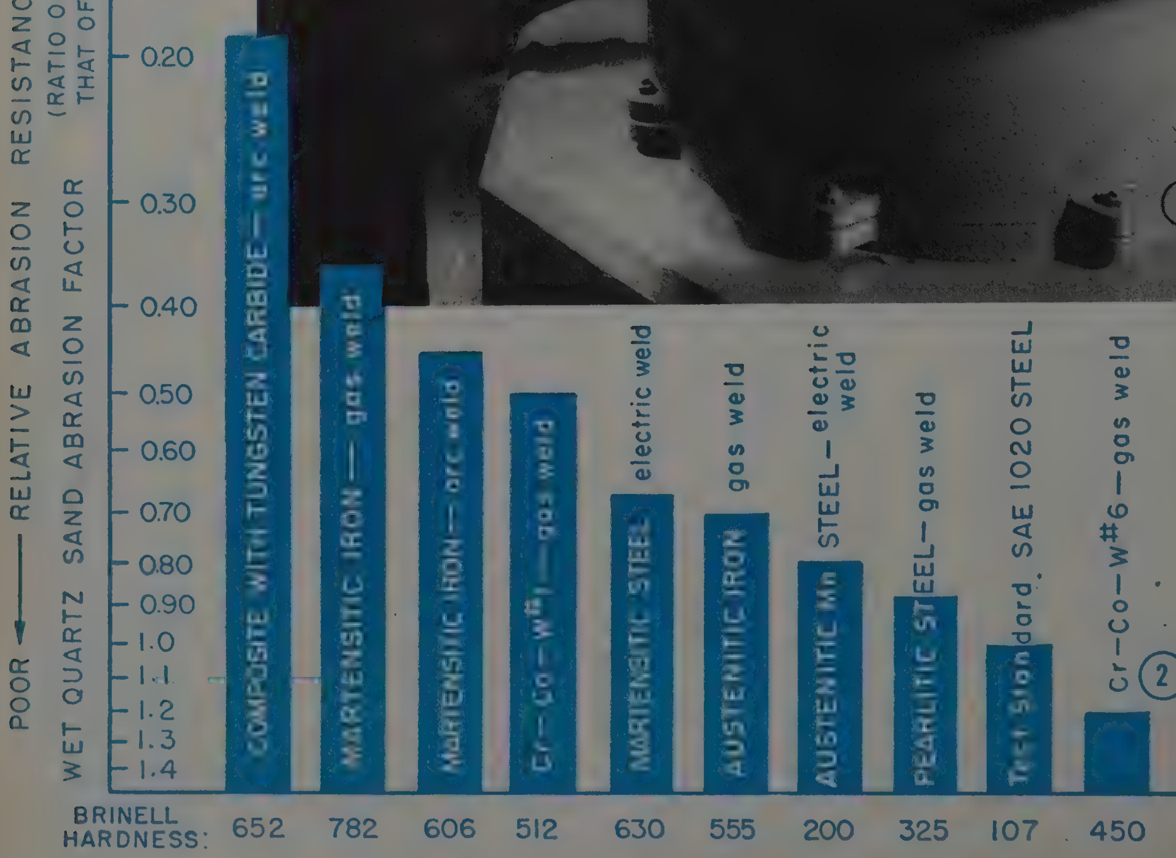
Even in a machine tool plant—traditionally closely allied to the foundry business—designers and draftsmen have surprisingly vague ideas as to how their drawings are going to be interpreted into patterns and castings. Mr. Morin pointed out many instances where the foundry engineer caught things on drawings which either would be impossible to cast —or at least extremely difficult and expensive to cast. Simple changes suggested by him solve these difficulties, save the company money and result in better end products. The most common error committed by draftsmen and designers is to call for complicated coring, with the thought in mind that saving metal means saving money. The intention may be good but the fact is that the added costs of the fancy core work more than wipe out the saving in metal, slow down production in the foundry and run up spoilage. Mr. Morin gave examples of suggestions made by the foundry engineer which resulted in strategic placement of metal rather than its elimination through complicated coring and through complicated patterns involving troublesome loose pieces which frequently get lost or burned up.

This presents a good example of the truth that in modern machine design no man can know everything about everything involved. Therefore it generally is recognized that hydraulic, electrical and electronic specialists are "musts" in the modern drafting room. Jones & Lamson have all these and a foundry specialist too. That's good Yankee common sense.

Hard

Fig. 1—Abrasion testing device from which wet sand abrasion factors were obtained





By HOWARD S. AVERY
Research Metallurgist
American Brake Shoe Co.
New York

Surfacing BY FUSION WELDING

Need for armoring parts against severe service requiring wear, corrosion or heat resistance—or perhaps all three—can be met by depositing a hard surface overlay 1/32 to 3/8-inch thick from welding rods. Materials for this purpose are available in the form of carbides, nitrides, borides, composite metals cobalt, nickel and iron base alloys. Technique is reputed to increase life of parts

PROVISION of a hard, wear resistant surface layer on metal parts by fusion welding is one of the most versatile expedients at the command of the engineer. Hard facing alloys are available in the form of convenient welding rods and the sources of necessary heat, usually the oxyacetylene flame or electric arc, are portable, relatively inexpensive, and familiar to engineers and mchanics. Thus the process is perhaps unique in its ready field applicability; it is little more difficult to produce highly satisfactory results in quarry, mine, mill or smelter, or on farm, shipboard, or construction job than in a manufacturing shop.

The essentials are welding equipment, skill of the welder, appropriate welding rods, and engineering knowledge that permits good judgment in application of the materials involved. To present some salient aspects of the metallurgy of hard surfacing alloys as they affect engineering properties, the materials for hard surfacing will be featured in the following discussion.

Fig. 2—Relative abrasion resistance of hard surfacing deposits as determined by American Brake Shoe Co. laboratory test

Fig. 3—Relative abrasion resistance of several common materials and structures as determined by American Brake Shoe Co. laboratory test

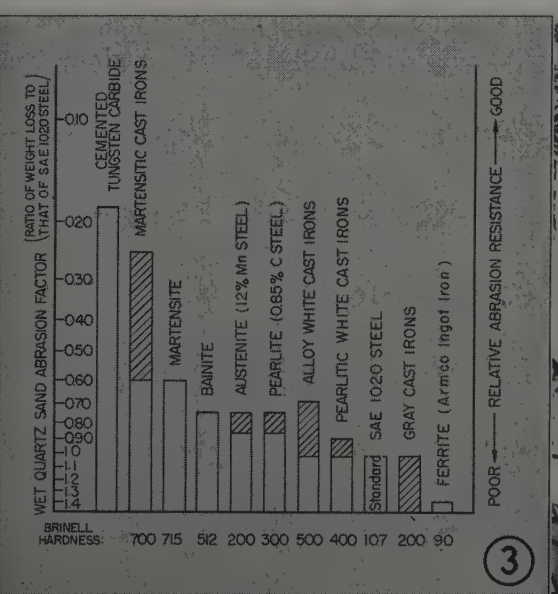
Fig. 4—Microhardness methods demonstrated on Ni-hard cast iron. 500X (See footnote at right)

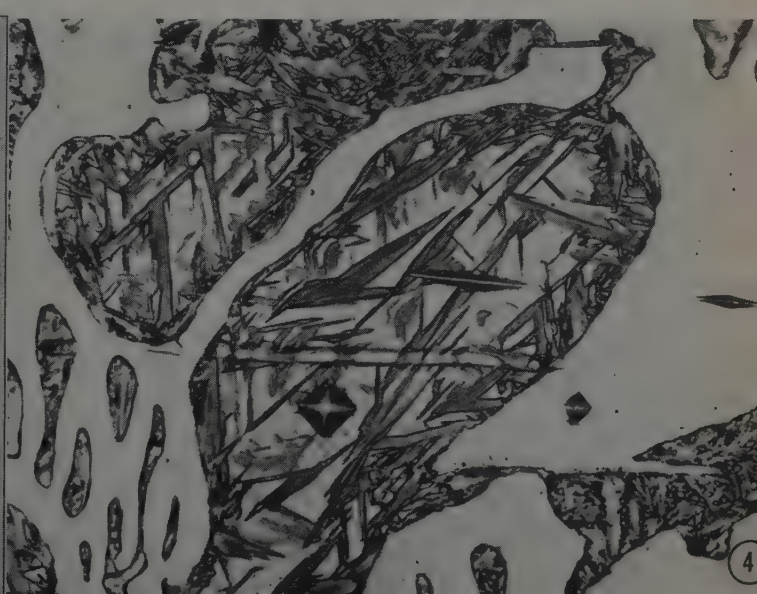
Selection of hard facing as an engineering technique is strongly influenced by the need for armoring a part against severe service. In addition, the factor of protection in depth is generally required, though in some field repair work this may be less important than the ease of application.

If superficial protection alone is required, a manufacturer will probably select a case hardening process, such as carburizing or nitriding, providing a hard zone a few hundredths of an inch thick to minimize wear; hard chromium plating to discourage scratching; various electroplates or hot dip coatings to combat corrosion; or perhaps metal spraying to prevent surface deterioration or to provide heat resistance (aluminum or chromium). All of these processes are limited to the thickness of the protective layer that may be obtained practically or economically. If an armor from 1/32 to 3/8-inch thick is required, hard surfacing is the preferred choice.

A surface overlay deposited from welding rods may be required for either wear resistance, corrosion resistance, heat resistance, or perhaps all three. Other special properties, such as reflectivity, are occasional-

Constituent	Vickers	Knoop	Microcharacter	Wet Sand Abrasion		
				Rc	BHN	Factor
Martensite	362	555	1700±			
Carbide	1125	1130	5000±	62	600	0.27





ly necessary. Most hard surfacing is done to prevent wear, however.

Life Expectancy of Parts Enhanced—From field experience, hard facing is reputed to increase the life of parts from two to 25 times. Specific examples include ten to 18 times the life of plain steel for hard faced cement mill grinder rings (with further economy from elimination of nine replacement shut downs and 15 per cent to 20 per cent increase in production because of better machine efficiency); seven to ten times increase in life of hammer mill hammers; three to 15 times greater plowshare life; a tenfold increase of brick machine feeder shoe life after replacement of cast iron; and fivefold improvement of vertical pug mill push shoes.

In coke manufacture, carbon scrapers were increased from a life of 3 days to 75 days by hard facing; water-cooled pokers were improved from 3 months to 2 years in life; hard faced power shovel dipper teeth outwore an ordinary set by 7 to 1; tungsten carbide insets increased the life of similar teeth before dulling from 6 to 120 hours, with improved efficiency.

Steel mills have benefited by hard facing rolling mill guides, with a typical increase of ten times in life. This application requires combined heat and abrasion resistance. In one case, a steel plant (in the Pittsburgh district) increased the life of guides for a 15-inch rolling mill from an average of 600 billets for chilled iron to an average of 150,000 billets per set of guides hard surfaced with a martensitic cast iron. Scratching of the billets was also eliminated. One steel company is said to have saved the sum of $10,000 per year on one item: Hot ingot grappling tong points.

Certain techniques involving composite tools permit startling economies. Forging dies or cutting tools such as milling cutters and single point turning tools, when necessarily quite heavy, may within their normal useful life lose only a tiny fraction of their total mass. In many cases it has been found practicable to make them of 0.30 per cent to 0.40 per cent carbon steel with a working point or surface of a weld deposit similar to the steel required. A 600-pound die may be made with perhaps 100-pounds of welding rod. It is cast almost to final shape, surfaced, annealed, machined, and hardened at perhaps a 70 per cent saving in labor (because of substitution for expensive die sinking). Furthermore, because of superior properties of the weld metal a life increase in a 7:2 ratio resulted in one example.

Savings from tool bits result differently; an insignificant quantity of high speed steel deposit serves for short runs with special tools thereby saving a large tool inventory investment. This does not preclude long run service, but the savings from these may be less impressive.

Diversity of service represented by the above examples will explain why many matching laboratory tests have not been devised and also why it is not practical to predict field performance from one wear test. Nevertheless, the test data reported here are valuable for ranking materials, and may be used for this purpose if the associated conditions are properly considered.

Other factors besides metal loss contribute to the economics of hard facing. The savings in manhours, as shutdowns for replacement are avoided, may be considerable. Also, where sharp tools or dimensional stability are important the judicious application of hard facing may add greater operating efficiency to the benefits of longer life. As an example, where differential wear of base and surface layer occur, careful placement of the deposit will produce a self-sharpening composite. This feature is exploited in dipper teeth, plow shares and kindred parts.

Fig. 5 — Extrusion coating welding rods for electric welding

Fig. 6 — Electric melting furnaces for manufacture of hard surfacing welding rods. Induction furnaces, foreground, provide means for precise analysis control of critical alloys, while the arc furnace, by means of its slag, permits metal refinement and removal of undesirable elements

Abrasive Wear—Abrasive wear, which is the result of scratching, has been studied chiefly by a time tested laboratory technique of known reliability and a good correlation with field experience in ball mill grinding. It uses abrasion by wet quartz sand without impact to determine weight loss in comparison with annealed SAE-1020 steel. Data are reported as abrasion factors that are ratios of weight loss versus that of the 1020 steel standard, Fig. 3. The results can be used for guidance in selecting materials when service conditions are sufficiently similar.

In common with all other wear tests the limitations have not been clearly established; it must suffice to note that it will not rank materials in the same order as a pneumatic abrasion test (sand blast) nor will it reveal the true merit of very tough materials in service involving heavy impact. It is not representative of metal-to-metal wear. However, such a controlled laboratory test is valuable as it permits establishment of test reliability, a study of pertinent variables and a convenient recheck of questionable results. The abrasion factors obtained will usually reproduce within about 0.03 provided the material is reasonably uniform.

Interpretation of Test Data—Interpretation of these laboratory test data should include allowance for hardness of the abrasive and relative severity of the conditions. Field circumstances may be quite similar, as is the case for ball mill liners, or they may be much milder, as exemplified by plowshares operating in soft dirt containing very little sand. As severity of abrasion or the hardness of the abrasive decreases, the relative life of materials with good laboratory abrasion resistance tends to increase.

Impact must also be considered to minimize the chance of sudden failure. Since toughness and high abrasion resistance are usually opposing factors a compromise is usually necessary if impact is appreciable. Where impact is high the preferred choice is austenitic manganese steel.

Hardness is considered an excellent criterion of galling resistance, provided allowance is made for the effect of frictional temperature on hardness. As an index of abrasion resistance it is frequently useful, especially for selecting an alloy that is harder than a given abrasive. For very hard grits like quartz sand, it is less reliable and many examples where hardness has an inverse relation to abrasion resistance have been encountered. Pearlitic white cast iron and unwork-hardened austenitic manganese steel are one case. Comparative hardness and abrasion resistance of some weld deposits appear in Fig. 2.

Welding Rod Performance—Welding rod manufacture and weld deposit technique are considered in relation to performance. Bare rods are used for gas welding while flux coatings are needed for electrodes. Alloys can be added by means of the coating, but with less assurance and uniformity than if they are part of the metallic rod. (Table I is an example of nonuniformity that may be encountered.)

Cooling rates of welds affect their hardness and other properties. Arc welds are characterized by faster heating and cooling, greater thermal stresses (which may cause cracking), a tendency to lose carbon through oxidation and a mixing with the base metal that may cause alloy dilution. Gas welding preheats the base, tends to add carbon to the deposit by pick-up from the flame, and generally causes slower cooling of the deposit. Gas welds frequently have better abrasion resistance because of carbon pick-up and because of the transformation control during slower cooling.

Hard Facing Alloys—Of the composite metals, the welds containing either molded inserts or crushed fragments of tungsten carbide are best known. They are made by anchoring small slugs of the hard metal

in place with a steel weld or by fusing a composite rod. The rods may be steel tubes containing carbide fragments and fluxes or may be crude heterogeneous castings in rod form.

Tungsten carbide provides maximum hardness at elevated and atmospheric temperatures, high modulus of elasticity, and very high abrasion resistance, but these must be balanced against high cost, minimum impact resistance, and vulnerability to thermal stresses. The weld deposits of best abrasion resistance are quite rough.

Smoother deposits result from fine carbide particles, but with arc welding especially these may dissolve, forming an alloy different in character from the expected aggregate. It is noteworthy that heterogeneous deposits of a related nature, with very hard carbides set in a softer matrix, are obtained from many hard facing rods, such as the high carbon chromium-cobalt-tungsten types and the various cast iron alloys.

A group, sometimes referred to as nonferrous hard-surfacing alloys, is composed chiefly of cobalt, chromium and tungsten in various proportions, with carbon as a very important minor element. Other elements, such as molybdenum or columbium, may replace or accompany the chief components. These alloys were first developed by Elwood Haynes, U. S. Patent 1,057,423 (1913), and 1,057,828 (1915) and have been widely exploited under the trade name of "Stellite", which is the forerunner of the variety of currently available materials of this type.

Nominal compositions may range up to 35 per cent chromium and 40 per cent tungsten, with the balance chiefly cobalt. Largely because of their chromium content, they are stainless and nontarnishing. The component metals have high melting points and have conferred a similar resistance to heat on the alloys. Their heat resistance includes two vital factors: Oxidation or hot gas corrosion resistance and elevated temperature strength, which is best represented in the hard-surfacing field by hot hardness.

Factors in Selecting Alloys — In the selection of these alloys for hard surfacing, hardness above 1000°F should receive primary consideration. Various sources give temperatures ranging from 795° to 1250°F as the point at which Stellite begins to exceed the hardness of high speed steel.

Scaling and corrosion resistance are secondary properties that may be important but are less often required. Hot gas attack of the 30 per cent chromium alloys is not serious below 1800°F, while resistance is good in the less severe media, in air, in foods and in some strong acids, such as nitric, acetic, citric, formic, lactic, sulphuric, sulphurous and trichlor-acetic. As a comprehensive discussion of corrosion is out of place here, it must suffice to suggest caution in applying these alloys under severe conditions. A preliminary field test, including all service factors, is advisable, as sometimes minor variables may be decisive.

These alloys are particularly valuable for hard facing parts subjected simul- (*Please turn to Page* 107)

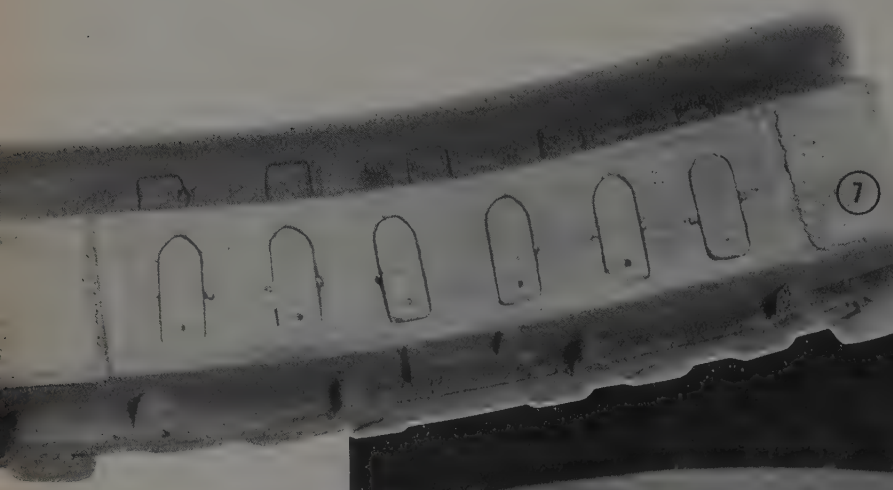


Fig. 7 — Example of a composite casting containing hard inserts, cast into place in a softer matrix that is controlled for frictional properties. This is a railway locomotive brake shoe. Insert arrangement is more satisfactory than hard surfacing in this case

Fig. 8 — Hardsurfacing grinding mill ring used for pulverizing cement clinker. About 75 pounds of martensitic cast iron overlay were required for this 7-foot diameter part. Up to 4500 hours of service resulted from hard-faced rings

To insure quality in the finished product of a commercial die production forging plant, good inspection procedures are essential. These include examining dies, hot and cold inspection of forgings, hardness, metallurgical, magnetic particle and physical tests, special examinations

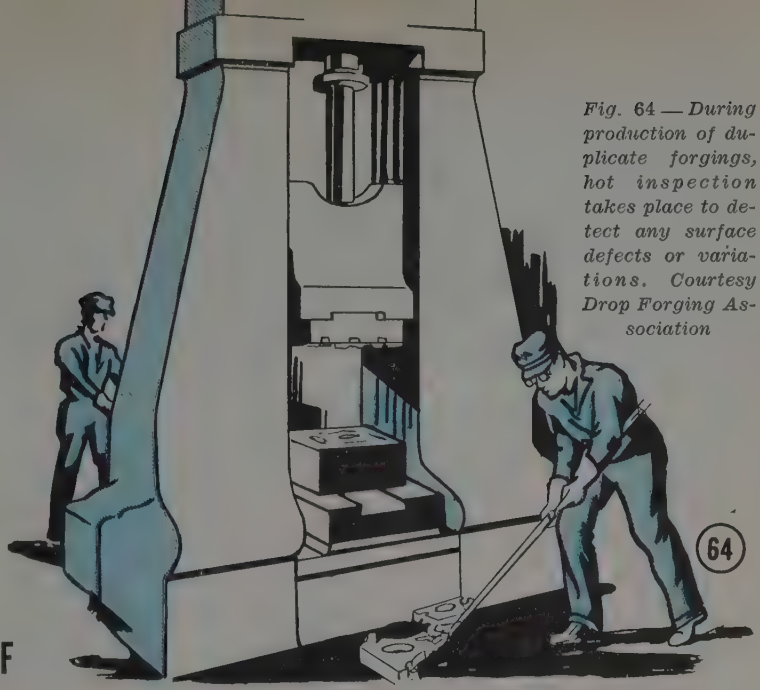


Fig. 64 — During production of duplicate forgings, hot inspection takes place to detect any surface defects or variations. Courtesy Drop Forging Association

FUNDAMENTALS OF Forging Practice

By WALDEMAR NAUJOKS

Part X of the current forging series

INSPECTION of forgings in a commercial die production forging plant is one of the important procedures to insure quality in the finished forging. Amount and types of inspection procedures vary to a considerable degree between the commercial forging plants. Furthermore, amount of inspection given to different forgings in the same plant may vary greatly. Certain inspections are given to all the forgings and other special inspections are given only to the forgings that require them because of the nature of the forging or because the examination is specified.

The inspection procedure depends upon the requirements of the forging. It is the purpose of all commercial forging plants to provide ample inspection to assure the quality standards to which they are working. Some conditions in a forging may be entirely satisfactory for the use to which the forging may be put, and these same conditions may be considered as unsatisfactory where the service conditions are more severe. It is important that forgings be given ample inspection to assure quality and service for the individual requirements.

Die Inspection—Die inspection is an important routine check in all die production forging plants to insure the correct shape with proper sizes to the forging. On a new set of impression dies, the first inspection begins when the finishing impression is completed. Dies are clamped together in correct relation to each other and a die metal, usually some alloy of lead, is poured into the final or finishing impression through the gate and sprue. When the lead casting is solid, it is removed from the dies and checked by the inspection department.

If all the dimensions are correct, the lead cast, sometimes called the "lead proof", is sent to the user of the forgings for his checking and approval. If the user also finds the lead cast correct to size, an approval is given. In the event errors are detected, the dies are corrected by the die department and another lead cast is made for checking. Dies that have been recut after the impressions are worn out, are checked by a lead cast in the same manner as for new dies.

Dies are inspected at the end of a production run before they are put away in the die storage racks. The condition of the dies is noted on an inspector's report, which indicates the probable remaining life and makes notes on repairs to be made before the dies are to be used again. Such repairs do not include recutting the dies, but indicate the dressing to be performed. Where recutting is necessary, the report indicates that the impressions are worn out. When the dies are required for a new production run, the inspector's report is

used to check the dies to be sure that the necessary repairs have been made.

Hot Inspection—Hot inspection is the series of examinations given the forging during the forging operations. When a set of dies is installed in a forging unit, such as a drop hammer, and the forging to be made is a new one which has never been made before, the first several forgings are inspected carefully for die alignment, unfilled sections, laps, seams, cold shuts and other defects that might be caused by small errors in designing the forging steps in the dies, Fig. 64. Corrections are made, if found necessary, and when the forging is free from mechanical defects, the inspection department takes one of the first of the good forgings from the production run for complete dimensional checking.

Upon being found correct to size, the forging unit is released for its production run. During production, a hot inspector gives the forgings a visual inspection and checks the major dimensions at regular and frequent intervals. This is done to be certain the dies have not gone "bad" for some reason and that the hammer operator has not become careless in his forging technique. When the die impressions have worn to the degree that the forgings are no longer within the tolerances specified on the blueprint, the hot inspector stops the forging operation at the forging unit. Dies are removed from the forging unit and a new set installed. The first forgings from the new dies are checked as described.

The hot inspector, in checking hot forgings for major dimensions and for visual defects, may find that faulty forging stock is responsible for surface seams. Where it is evident that the seams in the forgings are caused by seamy stock, he gives notice to the foreman in charge of

Fig. 65—Cold inspection in a drop forging plant. Courtesy Interstate Drop Forge Co.

Fig. 66—Grain flow in a crankshaft section

shearing and cutting so that no further bars will be cut. The matter of seamy stock is referred to the supplier for corrections or replacement.

Cold Inspection—Cold inspection, Fig. 65, includes a visual check given to each forging after it has cooled down from forging temperature, and dimensional checking of some of the forgings. Where trimming is necessary, on forgings that are to be cold trimmed, the trimming operation is performed and the forgings are cleaned by shot blasting or by one of the other cleaning methods. Forgings that have been hot trimmed are sent directly to the scale cleaning department. The cleaning operation is followed by a visual inspection in which all surfaces of each forging are inspected for cold shuts, poor surface condition, scale pits, unfilled sections, seams, poor cleaning, ragged trimming and any other defects that might reject the forgings.

Defective forgings that can be reclaimed are marked for salvage and

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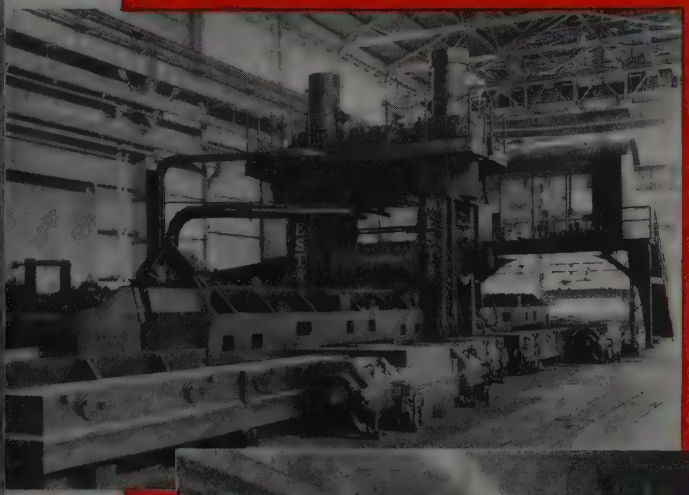

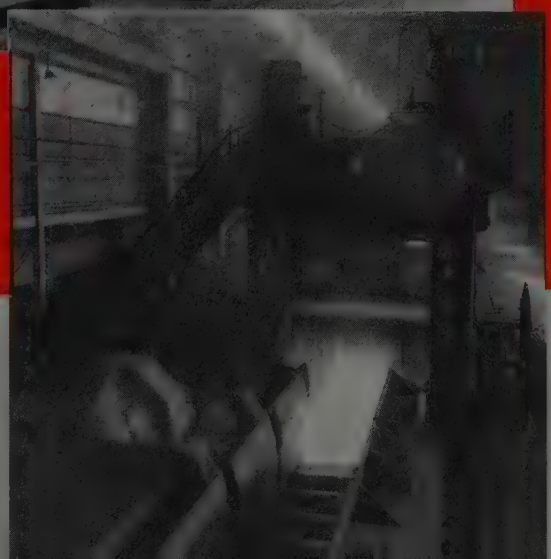

Mesta 36" Reversing Blooming Mill

Mesta 46" Reversing Slabbing-Blooming Mill

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PA.

Previous articles in the current forging series appeared in the following issues of STEEL:

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June 21, p. 98	Aug. 16, p. 94
July 5, p. 76	Aug. 30 p. 59
July 19, p. 99	Sept. 13, p. 100
Sept. 27, p. 89	

those with defects beyond salvage are marked for scrap. Forgings that have been put through salvage must again pass the cold inspection. Where forgings have considerable length in comparison to their cross-section area, they are checked for straightness. This includes such forgings as stems, shafts and connecting rods.

Defects — Some of the common defects occurring because of either improper die design or poor forging technique, are given below. Some of these defects are of an occasional nature and other defects may be throughout the entire lot of forgings.

Cold Shuts are short discontinuities of sound metal occurring mainly in corners and generally at, or nearly at, right angles to the surface of the part. They are caused by metal folding against itself to produce the crack-like discontinuity. They may be an occasional defect due to misplacing a piece of forging stock in the dies or they may occur in the entire lot because of improper die making or poor forging design.

Scale Pits are unsightly, irregular shallow depressions on the surface of the forging and are caused by scale in the dies so as to work into the surface of the forging. Upon cooling and cleaning, the scale is removed, leaving the scale pits on the surface of the forging. Scale pits are not harmful necessarily, but they are unsightly and undesirable.

Unfilled Sections or Underfills, are a lack of metal in parts of the forging and may be caused by one of several reasons. Improper size of forging stock, improper die design, poor forging design, or improper forging may cause unfilled sections throughout the lot of forgings. An occasional piece may have an unfilled section due to insufficient heating on a piece of forging stock, or may be caused by the misplacing of forging stock in the dies once in a while.

Die Shifts cause part of the forging to be out of match with the rest of the forging. This can be due to die misalignment or may occur in some types of forgings which have a tendency to pull the dies out of alignment with each other.

Mistrimmed Forging is an occasional defect where the forging is placed improperly in the trimming dies so as to shear away too much metal from one side of the forging and does not trim enough metal from the other side of the forging.

Ruptured Fibres are a discontinuity of the metal flow lines in the forging and the general cause is by too rapid a flow of the metal in the forging operation for some types of forging metals.

Fins and Rags are small pieces of loose metal that are driven into the forging to produce small nicks and shallow unfilled sections.

Out of Tolerance—when long and irregular shapes have uneven shrinkage in cooling so that centers are not within the tolerances required, even though the general dimensions are within tolerances.

Burnt and Overheated Metal is caused by improper heating conditions, or by soaking the forging stock too long. Careful control of all heating conditions is essential to good forging structure.

Uneven Hardness, Warpage, undersized sections, and other similar defects must be detected by inspection during the sequence of operations in producing the forging.

Hardness Testing — Forgings requiring heat treatment to specified hardness tolerances must be checked for hardness after the heat treating operations. Checking is performed on suitable equipment in the heat treating department or in the metallurgical laboratory. For normal commercial heat treating practice, about 10 per cent of the forgings are checked and if all are within hardness requirements, no further hardness testing is done. If, however, some are not within the hardness, another 10 per cent is tested. This is continued until it is certain that the forgings are within hardness requirements.

Fig. 67 — Flow lines in a connecting rod

Some specifications call for 100 per cent hardness testing, in which event all of the forgings are checked. Forgings that are too hard can be retempered to obtain a reduction in hardness. Forgings that are too soft must be given a complete reheat treatment by hardening and tempering.

Hardness testing on a commercial production basis is made on brinell or rockwell hardness testers. Most of the forgings being produced have an area on them which can be ground on a fine wheel to obtain a flat spot free from scale and decarburization on which the brinell indentation can be made, and where that indentation will not affect the usefulness of the forging.

Rockwell testing is used to some extent on forgings, especially where the parts are thin. In his book on "Inspection of Metals," H. B. Pulsifer states that different operators as well as different laboratories will probably come to better agreement over the brinell results than with other instruments. For high hardnesses, the rockwell method is preferred.

Large forgings, weighing hundreds of pounds each, may be difficult to place in the brinell testing machine or their thickness may be too large. For such large forgings the scleroscope hardness tester may be used. This instrument is portable and can be placed on the work to be tested. Large die blocks, for example, are tested for hardness by the scleroscope.

Forgings needing some of the several process operations such as coining, bending, forming, ironing, straightening and the like, are usually given cold inspection after they have been cleaned but before they are put through the operations required. This inspection removes forgings which must be salvaged or which are beyond salvage because there is no need to finish up a forging if it is beyond salvage. After each additional operation such as bending or ironing, the forging is again inspected before it is released for further processing.

Final inspection is the check which releases the forgings to the shipping department. Final inspection is given to make certain nothing has been overlooked in the previous inspections and that all of the conditions of the blueprint have been met. Forgings that do not pass the final inspection are marked for salvage if it is possible to correct the defects or they are consigned to scrap if the defects cannot be corrected.

Metallurgical Inspection — Metallurgical inspection may cover one or more of several types of inspection for the assurance of quality in the forging. Metallurgical inspection is concerned with surface defects such as seams, cracks and breaks caused by other means than in the forging operations. Seamy forging stock, pipes in stock, cracks from heat treating, poor or coarse grain struc-

(*Please turn to Page* 123)

taneously to wear, high temperature, and corrosion, as in valve seats. Similar alloys containing nickel in addition to chromium, cobalt, and tungsten are also being applied as valve facings.

Abrasion Resistance—Abrasion resistance, especially if the abrasive is wet and high temperatures do not develop, should not be considered a marked characteristic of the lower carbon chromium-cobalt-tungsten alloys. This statement is somewhat at variance with popular ideas and requires explanation, which is provided by an examination of structures and abrasion test data. If carbon is relatively low, the structure, as revealed by microscopic examination, consists of a solid solution matrix containing some scattered carbides in eutectiform arrangement.

An increase of carbon from 0.53 to 1.04 per cent causes an increase in hardness to 444-460 BHN, which is explained by the increased number of small carbide particles. The associated wet sand abrasion factor is so high, however, (around 1.20) that the expense in comparison with ordinary steels is not justified. A further increase to 2.65 per cent carbon causes distinctive rods or pseudohexagonal crysals to appear in the microstructure. These are believed to be complex chromium carbides, whose presence is associated with a marked improvement in abrasion resistance, (factors around 0.50). These carbides resulted from crystallization from a molten weld deposit, but otherwise the analogy with the composite tungsten carbide type is obvious.

Thus, the high carbon chromium-cobalt-tungsten alloys may have good abrasion resistance as well as hot hardness. However, if elevated temperatures are not involved, the expensive cobalt base alloys do not appear economically justified; equal, or better, abrasion resistance may be obtained from martensitic cast iron welding rod deposits as described later.

Nickel Alloys—Nickel hard-surfacing alloys are not common. One group is available, however, that features hardening by chromium boride. The 65 per cent to 75 per cent nickel, 13 per cent to 20 per cent chromium alloy with 2.75 per cent to 4.0 per cent boron is said to have high red hardness, very high wear resistance, and very high corrosion resistance. Wear resistance probably is best developed in metal to metal contact where heat and corrosion are involved. Its wet sand abrasion resistance is not high enough to justify its recommendation for related service. The alloys as a group are probably most comparable to the chromium-cobalt-tungsten type that are hardened with carbon. In both, red hardness and corrosion resistance are factors that should determine their selection. With high hardness, they may have excellent resistance to galling, but this property may be obtained more economically with martensitic cast irons or steels.

Without the boron and with about 0.50 per cent carbon, the nickel-chromium alloy represents a standard heat resistant grade that is frequently specified for castings, particularly for carburizing containers and cyclicly heated furnace parts. It is a member of a group of alloys that have outstanding hot gas corrosion resistance and excellent strength at elevated temperatures. The higher nickel compositions also have good resistance to carburization and resist embrittlement (at red heats) from carbon absorption. They are available as castings or welding rods.

Heat and Corrosion Resistance—These nickel-chromium-iron alloys are not intended for hard surfacing but where heat resistance and corrosion resistance to hot gases or cold liquids are required they may provide very satisfactory overlays. For convenience, several of the most important are listed in Table II, with test data indicative of their oxidation resistance and mechanical properties. These alloys (except the HC type) are characterized by an austenitic matrix containing scattered chromium carbides. Some of them are nonmagnetic and are useful because of this property.

A series of nickel-base alloys intended primarily for corrosion resistance and normally furnished as castings, may be weld deposited to provide overlays with exceptional stability in certain media. Nominal compositions appear in Table III.

The 60 per cent nickel, 20 per cent molybdenum, 20 per cent iron alloy is employed primarily for resistance to hydrochloric acid, which rapidly attacks practically all of the stainless steels in concentrations above 1 per cent to 3 per cent, and may be destructive when even weaker, if at elevated temperatures. The molybdenum content apparently confers marked resistance to such corrosion. The alloy also performs well in sulphuric, formic, and acetic acids, salt spray environments, and in alkalis. It is vulnerable to nitric acid and to free chlorine. The higher molybdenum grade is appropriate for handling boiling hydrochloric acid and wet HCl gas.

The modification with about 15 per cent chromium has similar properties, but is slightly better in sulphuric

TABLE I

COMPOSITION AND PERFORMANCE OF THREE SPECIMEN COMPOSITE WELDING ROD TYPES

Type:	A	B	C
Steel Portion:	Sheath or Tube	Soft Steel Wire	Soft Steel Wire
Alloying Ingredients:	(In Tube Filling) Ferrochromium, Ferrosilicon Ferromanganese, graphite, etc.	(In Flux Coating) Ferrochromium, graphite, manganese dioxide, and silica, etc.	(In Flux Coating) Ferrochromium, manganese, dioxide, silica, graphite, etc.
Analyses of	Tube / Filling	Core / Coating	Core / Coating
C%:	0.12 / 4.85	0.21 / 4.22	0.18 / 2.04
as graphite:	.... / 1.40	.... / 2.93	.... / 0.27
Mn%:	0.37 / 23.15	0.50 / 19.15	0.49 / 16.60
Si%:	0.02 / 7.20	0.02 / 6.23	0.02 / 6.93
Cr%:	0.01 / 41.40	0.01 / 32.40	0.01 / 37.80
Fe%:	99+ / 22.20	99+ / 14.66	99+ / 15.10
	Electric Weld Deposit	Electric Weld Deposit	Oxy-Acetylene Weld Deposit
C%:	0.60	0.64	1.45
Mn%:	2.41	4.27	2.78
Si%:	0.40	0.96	0.24
Cr%:	6.02	13.04	12.14
Fe%:	90.1	79.9	82.9

Test results on each of four individual weld deposits

Specimen	A Hardness Rc	A Hardness BHN	A Wet Sand Abrasion Factor	B Hardness Rc	B Hardness BHN	B Wet Sand Abrasion Factor	C Hardness Rc	C Hardness BHN	C Wet Sand Abrasion Factor
1	41	340	0.83	31	302	0.99	37	286	0.74
		444			377			302	
2	42	332	0.86	30	286	0.88	36	255	0.92
					302			340	
3	48	387	1.07	34	286	0.97	44	364	0.88
					302			477	
4	46	321	0.80	35	302	1.08	36	277	0.88
					311			302	
Average	44	417	0.90	33	303	0.98	38	325	0.88

NEW METHODS BRING "SPECIAL-MOTOR" SMOOTHNESS TO STANDARD MOTORS

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Motor-making traditions have been broken by the basketful. Users were surveyed to find what they wanted in standard motors that they were not getting. Life-Line motors were designed and built from scratch—by new methods and new tools in a totally new plant—to include these features.

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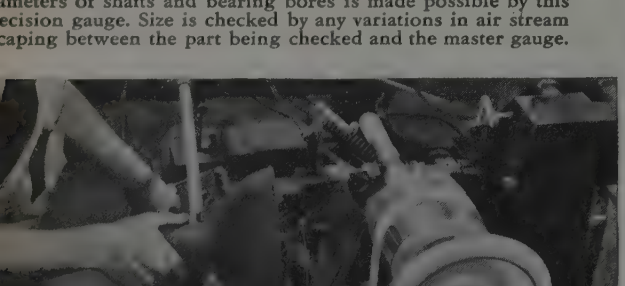

ERY UNIT BALANCED. *Every* Life-Line rotor—not random sames—is balanced on a Dynetric balancing machine* to insure aximum possible freedom from vibration of every unit.
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MOTOR "ASTHMA" CHECK. Sounds that shouldn't be there d get by this "noise detective". Audiometer tells noise wave len sound level meter (left) checks decibel rating; sound anal (right) tells the relative amount of different frequencies resul

Life-Line

SMOOTH? HERE'S PROOF! Coin balanced on edge on a Life-Line motor remains undisturbed as motor is started, runs and stops—dramatic evidence of Life-Line's freedom from vibration and resulting noise!

TABLE II

PROPERTIES OF IMPORTANT HEAT RESISTANT ALLOYS*

Type:	28Cr	21Cr:9Ni	26Cr:12Ni	26Cr:20Ni	16Cr:35Ni	12Cr:60Ni
A.C.I. Designation:	HC	HF	HH	HK	HT	HW
C% (1)	.30	.25-.35	.30-.40	.27-.71	.35-.70	.31-.77
Ni%	0-3	8-11	10-13	19-21	34-37	59-62
Cr%	27-30	18-23	23-27	23-26	13-17	10-14
Room Temperature Tensile Properties (2) On Small Castings						
Yield Strength—p.s.i.	.....	40-50000	40-54000	62-83000	40-53000	36-39000
Ultimate Str.—p.s.i.	67250	73-95000	80-95000	66-100000	65-71000	68-78000
Elongation—%	0.5	27-47	14-40	6-26	5-14	3-13
Red. Area—%	0.5	26-40	13-45	7-25	5-18	4-11
Hardness—BHN	238	163-181	160-190	175-202	150-195	160-220
Hot Gas Corrosion As Metal Loss In Inches Per Year (3)						
In Air at 1600° F.	.019	.013	.007	....	.0063	.0055
	.017	.001	.005	.004	.004	.0043
In Air at 1800° F.	.048	.14	.039	.025	.029	.012
	.038	.037	.030	.02	.0097	.0092
In Air at 2000° F.	.063	.6	.097	.07	.26	.045
	.05	.1	.071	.049	.048	.037
In Oxidizing Flue Gas						
5gS per 100 cu. ft.—	.029	.14	.036	.029	.075	.038
1800° F.		.035	.029	.026	.025	.024
100gS per 100 cu. ft.—	.033	.12	.033	.027	.085	.05
1800° F.	.03	.033	.027	.024	.024	.028
5gS per 100 cu. ft.—	.50	1.0	.5	.15	.30	.07
2000° F.	.15	1.0	.10	.05	.07	.025
100gS per 100 cu. ft.—	.17	1.0	.12	.07	.25	.07
2000° F.	.07	.10	.07	.03	.04	.02
In Reducing Flue Gas						
5gS per 100 cu. ft.—	.026	.34	.048	.028	.056	.027
1800° F.	.025	.046	.026	.022	.026	.017
100 gS per 100 cu. ft.—	.034	.48	.036	.025	.46	1.8
1800° F.		.034	.028	.022	.036	.036
5gS per 100 cu. ft.—	.25	1.0	.3	.10	.15	.03
2000° F.	.04	.3	.035	.02	.04	.02
100gS per 100 cu. ft.—	.5	1.0	.5	.10	1.0	1.0
2000° F.	.07	.4	.05	.025	.10	.025

* In the design of H.R.A. parts, creep and rupture strength are vital properties; in weld overlays they may usually be neglected as the load carrying properties of the base metal overshadow them.

(1) Nominal range to cover tensile properties given here; not part of usual specif's.

(2) Data from research program of The Electro Alloys Div., Elyria, Ohio.

(3) Data from research program sponsored by the Alloy Casting Institute at Battelle Institute; test specimens provided by the Experimental Foundry of the American Brake Shoe Co. The significant elements other than Cr and Ni were: C: 0.31-0.50%; Mn: 0.67-0.90%; Si: 0.76-1.35%; and N: 0.01-0.14%. The ranges given reflect the Cr. and Ni extremes.

(From manuscript of "Hard Surfacing by Fusion Welding", by Howard S. Avery, American Brake Shoe Company, 1947)

acid and is also suitable for oxidizing media such as nitric acid, free chlorine, and acid cupric or ferric salt solutions.

The 10 per cent silicon grade has fair resistance to cold hydrochloric acid, is excellent in acetic, formic, and phosphoric acids, and is well suited for handling sulphuric acid or sulphur trioxide.

The nickel-copper alloy, which is very widely used in wrought form, is valuable for corrosion resistance in many applications. Sulphuric acid up to 80 per cent, hydrochloric acid up to 5 per cent (if quiet and not heated), cold phosphoric acid, acetic, formic, tartaric, lactic, citric, oxalic, and malic acids, sodium chloride solutions, alkalies, fresh and sea water, food products, and steam are usually resisted satisfactorily. Agitation, aeration, and high temperatures tend to increase the severity of corrosion. Nitric and sulphurous acids, ferric salts, stannous and mercuric salts in acid solution, alkaline hypochlorite solutions, fused sulphur and low melting metals should not be used with this alloy.

Steel for Hard Surfacing—As these metals are relatively expensive, especially with high molybdenum contents, stainless steel should receive first consideration for suitability. For general corrosion resistance, and especially for nitric acid service, the austenitic chromium-nickel-iron alloys, typified by 18 per cent chromium: 8 per cent nickel, are satisfactory and less costly.

Distinctions between soft iron, steel and cast iron are based on carbon content. As the low carbon ferrites, typified by ingot iron and wrought iron, have little value for hard surfacing, the important ferrous materials should be considered as alloys of iron and carbon, sometimes modified by additions of hardening and strengthening elements. The division between steels and cast irons is usually drawn at 1.7 per cent carbon, which is the maximum that unalloyed iron can hold in solid solution. This percentage is changed by alloying elements. The amount of carbon has an important influence on hardness, which is increased, and toughness, which may be decreased, as carbon is raised.

Steels are recommended for hard surfacing where strength and toughness are important and economy is a consideration. The chromium-cobalt-tungsten types previously described are also tough and strong if carbon is low, but the cobalt base is usually a needless expense. The unique position of steel as an engineering material is paralleled in the welding rod field. As with structural and special purpose steels, a classification based on structure is most significant.

Austenitic Manganese Steel—Most widely known austenitic steel is Hadfield's austenitic manganese steel. It usually contains from 1.0 per cent to 1.4 per cent carbon and 10.0 per cent to 14.0 per cent manganese when produced in cast form. The function of the manganese is to inhibit the normal transformation of austenite to the constituents already described. If rapid cooling from above the critical temperature occurs no transformation takes place because of the sluggishness imparted by manganese, and the austenitic structure is retained indefinitely at atmospheric temperatures.

Normal cooling after casting is too slow, however, and the as-cast alloy exhibits small amounts of cementite, pearlite, or martensite. These appear chiefly along crystal grain boundaries, forming a brittle network, and confer very inferior properties. To austenitize and toughen the steel, it is reheated to about 1850°F and water quenched, forming a uniform and very tough austenitic structure. This will not transform unless it is reheated to some temperature above about 600°F or is mechanically deformed.

Reheating from 600°F to 1400°F produces grain boundary transformation that seriously embrittles the alloy. However, deformation by cold work, usually from pounding or plastic flow in compression, causes a transformation that gradually exchanges ductility for hardness without developing any localized zones of weakness. As this commonly occurs at a working surface, the process becomes a kind of case hardening that is self-renewing as the metal is worn away. This combination of surface work-hardening, high tensile strength (120,000 to 140,000 pounds per square inch), high ductility (30 per cent to 50 per cent elongation), toughness (Charpy impact above 90 foot pounds), and good wear resistance has led to wide use in applications involving abrasion and heavy impact.

Building up Worn Areas of Steel Castings—Manganese steel welding rods may be required to build up worn areas of manganese steel castings, to repair fractures, or to provide a wearing surface on some dissimilar material. The latter use may be classed as hard surfacing, but with the qualification that some form of deformation is required to produce the hardening after the weld deposit is made.

It is not recommended that manganese steel deposits be applied to a weak or brittle base material. Toughness, not abrasion resistance, as such, is the unique property of austenitic manganese steel. It is better as a base than as a surface coat-

How to Build Stronger, Lighter Levers at Less Cost

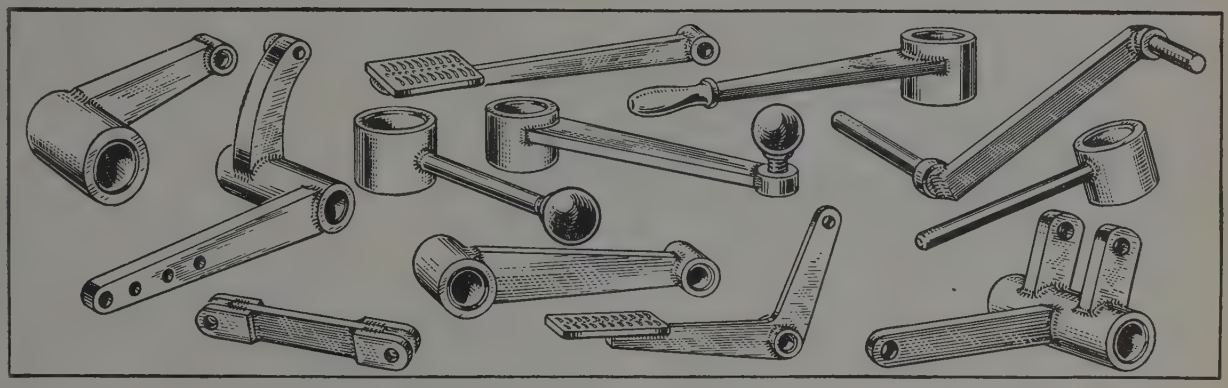


Fig. 1. Typical machinery operating levers that are being weld-fabricated at lower cost with arc welding.

ALL types of levers are being weld-fabricated in shops throughout the country, helping to produce stronger, lighter machinery construction with improved appearance . . . *all at less cost than with other methods.* Here is how these levers are built:

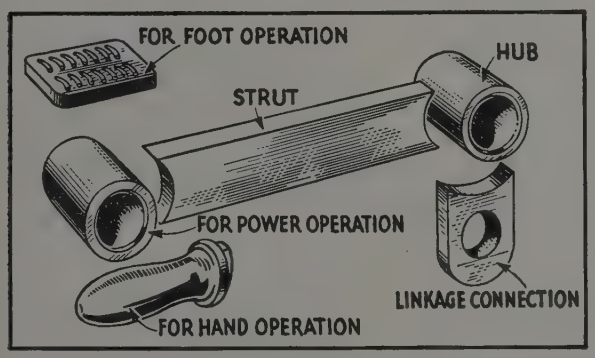


Fig. 2. Basic elements of levers for different types of operation.

More detailed data on the design of levers for arc welding is contained in the "Procedure Handbook of Arc Welding Design and Practice." Price $1.50 postpaid in the U. S. A.; elsewhere $2.00.

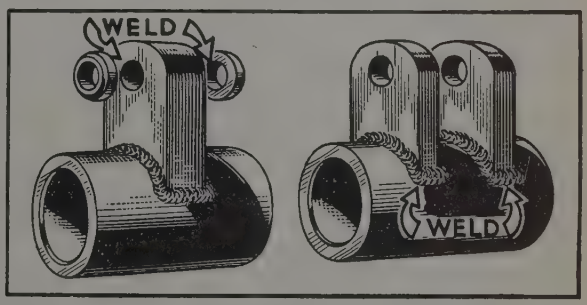


Fig. 3. Linkage connections for power take-off, made from steel straps.

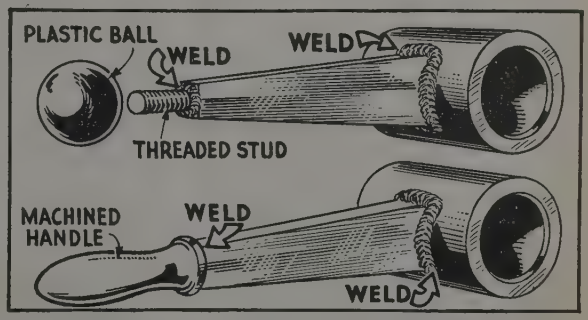


Fig. 4. Handles weld-assembled for manual operation.

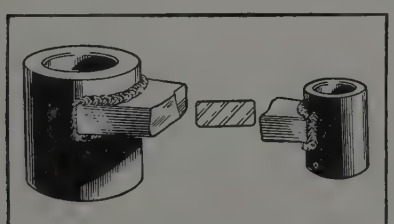


Fig. 5. Plain rectangular strut welded to hubs. For normal loads.

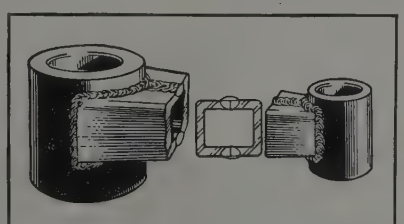


Fig. 6. "Box" section design strut for strong, light-weight construction.

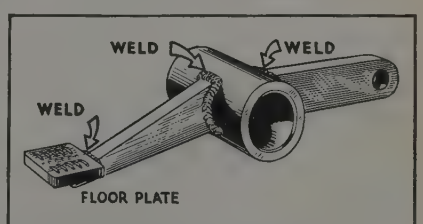


Fig. 7. Floor plate weld-attached for foot operation.

ing. Its chief usefulness is in building up the worn or battered down portions of members that must be strong and tough, such as frogs and crossings in railway trackwork.

Nature of manganese steel introduces several metallurgical problems into welding practice. First, the base metal, if it is manganese steel, must be protected from overheating. As described above, if it exceeds 600°F for long, an embrittling transformation may occur. This is best avoided by electric welding, small diameter rods, low welding currents and careful procedure on the part of the welder.

Normal composition for casting is not satisfactory for welding as field requirements generally prevent use of the toughening heat treatment. The structure should therefore be entirely austenitic after cooling from the welding heat. This is attained with a sacrifice of some toughness and strength by lowering carbon content and adding additional alloying elements, such as nickel, molybdenum, etc., to make transformation even more sluggish. The alloys may be in the welding rod or incorporated in its coating; the source is immaterial after melting, but inclusion in the metal rod is preferable as more homogeneous deposits result. The brief interval while the deposit is molten, when mixing must occur, is not conducive to uniformity.

Austenitic Stainless — Austenitic stainless steels are used as overlays when surface corrosion resistance is required. Most useful are AISI types 309 (19 per cent chromium: 9 per cent nickel); 347 (19 per cent chromium: 9 per cent nickel with columbium); which is formulated to minimize intergranular corrosion; 316 and 317, which contains molybdenum for enhanced resistance to corrosion by sulphuric and sulphurous acids and salts, and to pitting; and 309 (24 per cent chromium: 12 per cent nickel) or 310 (25 per cent chromium: 20 per cent nickel), which are low carbon compositions similar to the HH and HK heat resistant alloys.

If the corrosion resistance of the 18 per cent chromium: 8 per cent nickel grade is required and is to be obtained by an arc deposited overlay on ordinary steel, it is advisable to use a more highly alloyed welding rod, such as 309 (24 per cent chromium: 12 per cent nickel) or 310 (25 per cent chromium: 20 per cent nickel) to compensate for dilution of the weld by molten base metal.

Pearlitic steels as overlays are useful but have much lower toughness than the austenitic grades, which have abrasion resistance of the same order even when they are softer. For maximum abrasion resistance coupled with the toughness of steel structures, the martensitic overlay is best. This requires a rod containing alloys balanced to produce martensitic air hardening as the weld deposit cools, and are frequently similar to tool steels. High-speed steel itself can be used for hard surfacing and is excellent for producing weld tipped tools.

Cast Irons — In the field of cast irons, containing more than 1.7 per cent carbon, lie some of the best hard surfacing alloys. They are relatively economical but nevertheless may give outstanding performance. Gray cast irons are little used, as the presence of graphite is detrimental to abrasion resistance; pearlitic white irons are better, but have a poor combination of extreme brittleness and mediocre abrasion resistance; but austenitic and martensitic alloy irons have several valuable properties.

Chromium up to 30 per cent is usually added to cast iron to produce an austenitic weld deposit. The weld contains crystals of very hard carbides set in a softer matrix and is very similar to the high carbon Stellite or chromium - cobalt - tungsten types in mechanical and wear properties (but not in red hardness or chemical stability). Such structures have excellent metal to metal wear resistance and do well against anchored or relatively soft abrasives. However, against hard, loose abrasive particles such as quartz sand their performance may be mediocre, since undermining of the hard carbides may cause mechanical loss before they are actually worn.

Hard carbides set in a martensitic matrix overcome this limitation. Martensite is hard enough to minimize undermining, while still permitting the hard particles to carry the brunt of abrasion. Such martensitic irons, produced by carefully balanced combinations of alloys, give outstanding abrasion resistance, being generally better than all other types except the tungsten carbide overlays. The structure is typified by Ni-Hard, which has developed an enviable record as a cast wear resistant alloy. While Ni-Hard employs nickel and chromium as the essential alloying metals, other combinations are possible. These may be selected to confer additional properties, such as hot hardness, etc.

Because of their performance and of good fluidity and other welding qualities the martensitic irons are considered the most useful of the hard facing alloys for severe abrasion with moderate, compressive stress impact.

TABLE III
NOMINAL COMPOSITIONS OF NICKEL-BASE CORROSION RESISTANT ALLOYS

Type	Chemical Analysis						
	Ni%	Cr%	Mo%	Fe%	Si%	Cu%	Al%
A (a)	60		20	20			
B (a)	65		30	5			
C (a)	60	15	17	8	(Tungsten: 5%)		
D (a)	85				10	3	2
E (b)	69			2	1	28	

(a) "Hastelloy High-Strength, Nickel-Base, Corrosion Resistant Alloys", a pamphlet published by Haynes Stellite Company, Kokomo, Indiana, 1940.
(b) "Engineering Properties of Monel-Metal", Bulletin T-5, The International Nickel Company.

Heat Treatment

(*Concluded from Page* 94)

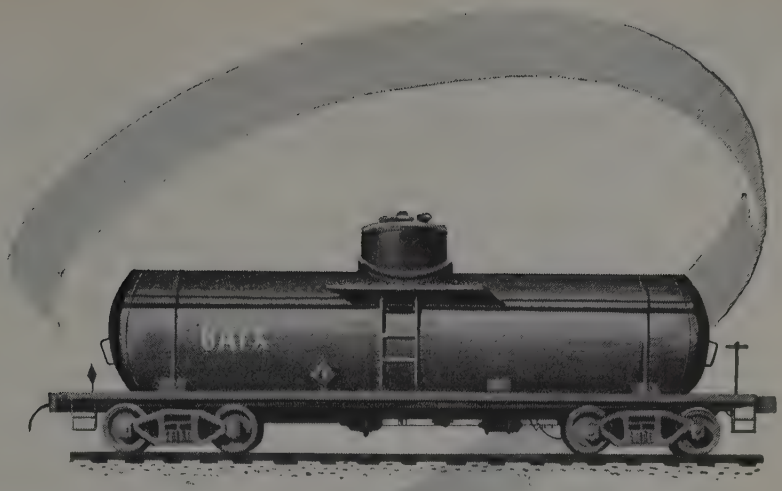
lower critical temperature during or preceding heating for austenitizing.

Normalizing—As ordinarily applied, the conventional normalizing treatment consists of air cooling from a temperature above the upper critical temperature. The resulting microstructure will, of course, depend upon the composition and the section size of the piece being treated, but for a great many of the commonly used alloy steels in moderate section size it will consist of a mixed microstructure of ferrite, pearlite, upper bainite and martensite. Although the actual goals of grain refinement and a carbide size and distribution which will redissolve more readily on subsequent austenitization, are achieved by this treatment, the mechanical properties of such mixed microstructures, particularly if untempered, are often very poor.

In order to take advantage of the superior properties of fine pearlite, the normalizing treatment may be modified in accordance with the principles of isothermal heat treatment so that the final product is a mixture of fine pearlite and ferrite rather than the mixture of ferrite, pearlite, bainite and martensite ordinarily obtained.

If the hardenability requirements can be met, and frequently this would mean only a small alloy addition or some acceleration of the usual air cooling rates, such an isothermal normalizing should furnish a very desirable heat treating method. Good mechanical properties could be obtained in materials in which, for reason of section size or economy, the attainment of tempered martensite or lower bainite would be impractical.

From data presented before summer meeting of the Society of Automotive Engineers, French Lick, Ind., June 8, 1948.



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Engineers Announce

DEVELOPMENTS IN MILL EQUIPMENT

Various technical papers presented at annual meeting of the Association of Iron and Steel Engineers tell of latest improvements in cold strip mills, flying shears, continuous buttweld pipe mills, sleeve bearings, transfer cars for blast furnaces and electric trucks for material handling

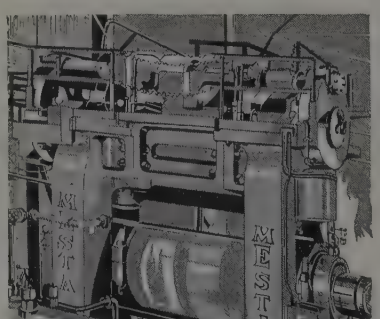
ADVANCEMENT in the design and operation of major and subsidiary equipment used by the steel industry was described in detail by the various authors participating in the various technical sessions at the annual meeting of the Association of Iron and Steel Engineers, Public Auditorium, Cleveland, Sept. 28 to Oct. 1. Highlights of the 4-day meeting were presented in the Oct. 4 issue of STEEL including the new officers of the association and the winners of the Kelly Award. A digest of the technical papers follows:

Electrical Equipment for Rolling Cold Strip at 70 Miles per Hour—by W. E. Miller, Steel Mill Division, General Electric Co., Schenectady, N. Y. The new Jones & Laughlin 5-stand mill is the first tandem mill with individual roll drives on the last three stands, the first with rotating regulator controlled screwdowns and the first to apply and regularly use x-ray equipment for measuring finished gage. The screwdowns are considered to be the fastest in response and speed of operation of any tandem mill. Use of a seperate generator for each stand considerably increases the flexibility of the tandem mill. Adjustments between mill stands are made by generator voltage control, as well as by motor field control.

An x-ray thickness gage is used on the mill to insure accurate measurement of strip gage as the finished strip is delivered from the last stand. Rotating type regulating systems are employed for the main mill speed control, twin drive regulating systems, reel tension control for maintaining constant reactive kva and for the adjustable voltage screwdown equipment. Four tandem mills are in service with rotating regulator control systems.

Improved Flying Shear Drive—by J. R. Erbe, Industry Engineering Department, Westinghouse Electric Corp., E. Pittsburgh, Pa.: The drive for this shear consists of a single motor which is direct connected to the bottom knife of the flying shear, and adjustable voltage direct- current generator driven by a synchronous motor, a rotating regulator, an electronics regulator, and two-pilot generators. A single motor direct connected to the bottom knife eliminates all gearing except that between the upper and lower shear knives. This lack of gearing readily permits the shear motor to be located in the motor room rather than crowded into an already cramped space near the last finishing stand pinion.

Because of high torque the shear drive is able to follow the shear voltage which is forced up to the desired value in practically a straight line. This means that the shear can be accelerated to the proper



speed in about ¾-second. Similarly it can be stopped in about ¾-second.

Developments in Continuous Buttweld Pipe Mills—by William Rodder, Vice President in Charge of Engineering, Aetna-Standard Engineering Co., Youngstown, O.: Condition of edge is important for obtaining a good weld and not leaving a seam on the inside or outside of the pipe. Good welds and pipe have been produced with skelp having a square edge. Round edges are detrimental for obtaining good welds. Slip strips have been used successfully and can be employed for making standard and extra heavy pipe ½ to 4 inches, providing that the edges are sound.

In order to have an efficient mill, arrangements and selection of the finishing floor, pickling and galvanizing equipment is of the utmost importance. Weight of coils or length of skelp in a coil is a major factor and must be given thorough consideration to make sure that time is available to build up the loop so that sufficient time is available for the end-welder to position ends of two coils in the welder, make the weld, and flash trim in approximately one minute.

A furnace skelp threading machine has been developed which eliminates the needle threading and the manual labor connected with it and also the number of needles which have to be handled and stored. A new type saw also is under construction for 1000 feet per minute. It is being built for a size range from ½ to 1½ inches and length of cut from 18 feet to 54 feet. Cutting tolerances expected are to be the same or better than on existing saws.

Use of wider skelp and greater reduction after welding pass offers the following advantages:

1. Greater production of pipe mill.
2. Higher furnace capacity in tons per hour. Furnace capacity increases with the cross sectional area of skelp, greater furnace efficiency.
3. Higher production and lower

costs per ton of skelp produced in mill.

4. Heavier coils from skelp mill which results in fewer end welds of flash welder per ton of pipe. It also increases time available for making end weld.
5. Better product inasmuch as the increased reduction immediately after welding improves the weld.

Sleeve Bearing Developments—by A. B. Willi Jr., Assistant Chief Engineer, Federal - Mogul Corp., Detroit: About seven years ago the greatest improvement in babbitt bearings was made with the development of manufacturing techniques which would permit their production with lining thicknesses as thin as 0.002 to 0.005-inch. Increase in fatigue resistance and consequential load-carrying capacity resulting from this, enable the automotive engine manufacturers to increase the power output of their engines without the need of using a premium priced heavy-duty bearing.

Application of bearing materials to a continuous steel strip has been one of the most noteworthy developments in the past ten years. Perfection of this process has made possible the production of high quality, heavy-duty bearings at reasonable costs.

The microstructure of statically cast copper-lead bearings has been materially improved by replacing sand core with graphite or reusable alloy steel cores.

Special Cars and Steel Plants—by E. W. Schellentrager, Vice President, Atlas Car & Mfg. Co., Cleveland: Of the various types of special cars used in steel plants, the blast furnace stockhouse scale car is probably the most important. One of the recent advances was the designing of the scales so that the main knife edges and bearings are enclosed in a steel housing which is part of the scale levers themselves. Thus these important parts are well protected but at the same time they are easily accessible for inspection.

Modern tendency is decidedly toward the use of double-compartment cars and cars of lighter capacity. Several of the newest furnaces are using cars of 40 tons capacity which are the largest blast furnace scale cars yet built.

Transfer cars are made in a variety of types and sizes with cars of 50 tons capacity predominating. An interesting unit now being manufactured actually is a combination center and side dump car. The hopper is divided so that part of the load may be discharged between the track rails and part outside of the track rails. The center and side dump compartment can be discharged simultaneously or selectively as desired.

A transfer car of modern heavy-duty construction is most economical in the 65-ton capacity size. Such cars have trucks of heavy solid steel plate construction arranged so that the motors and other parts will be protected when the car encounters piles of ore or other obstructions on the track. They will be hydraulically operated; discharge gates and brakes will be operated by oil under pressure rather than the customary compressed air equipment.

An interesting application has been made of transfer cars equipped with self-contained diesel electric power. These cars are provided with two complete power plants, one at either end of the car arranged to operate in unison or singly in an emergency. They also are of the side dump type with three compartments and are of 120-ton capacity.

Fuel Oil in the Steel Industry—by A. J. Fisher, Assistant Chief Engineer of Construction, Bethlehem Steel Co., Bethlehem, Pa.: The post-war trend from 1945 to 1948 is still from oil to coal or to fuels produced from coal. The steel industry is now trying to establish a coal basis in their operations. Catalytic cracking has enabled the oil industry to produce larger quantities of gasoline, kerosene, and distillate oils at the expense of residual oils. The installation of more and more of these 'cat crackers' will mean less and less residual oils—ultimately tending to force heavy industry back into the use of coal.

The steel industry is meeting this situation in the following manner. Blast furnace gas is being used to underfire coke oven batteries and soaking pits. Coke oven gas, thus liberated is being used in open-hearth furnaces up to about 50 per cent replacement without a loss in steel production, and boilers are being fired with powdered coal and coke breeze to replace the blast furnace gas. If fuel oil will ultimately have to be replaced entirely by coal, the second step will be to increase the use of coke oven gas to the open-hearth, supplemented by manufactured gas of similar characteristics to about 70 per cent of the total open-hearth requirement augmented by 30 per cent firing of tar or pitch or luminosity and flame radiation requirements. Manufactured gas could then be used in the heating and treating operations to entirely eliminate fuel oil from the steelmaking picture. This shift from oil to coal will of necessity have to take place gradually as local conditions warrant.

Master plans for making this change in fuels should be set up in each plant and no opportunity should ever be missed in designing the plant to accomplish this purpose. The increase in the cost of fuels due to scarcity or otherwise provides the incentive for fuel engineers to develop more efficient equipment for using it.

Modern Seal Devices for the Steel Industry—by R. A. Kraus, Republic Steel Corp., Cleveland: In addition to the critical task of first selecting the proper design of seal and the types of materials from which it is to be manufactured, maintenance force must also consider in detail such factors as surface finish of the mating member, method of the seal assembly, interference fit of the seal in the housing, provision for pressure relief where necessary, amount of shaft runout permissible, optimum shaft hardness, provision for steel lubrication as well as number of other factors in order to obtain the desired life cycle of the sealing device.

Felt seals are most useful on shafts having peripheral speeds under 2000 feet per minute with lubrication present and with good surface finish and hardness of shaft. However, felt has the ability of retaining its own lubrication for considerable periods, and thus has an advantage over many other types when used as a dust or water seal.

On ordering or installing felt seals the purchasing and maintenance department should exercise diligent care in the proper selection and purchase of these materials insisting on pressed felts of 100 per cent wool. Woolen felts having vegetable fiber fillers usually are not as satisfactory in sealing or as long lived as the better quality felt. When cutting felt seals, the difference between the inside radius and the outside radius should be at least 25 to 50 per cent greater than the felt wash or thickness. For most efficient sealing the inside diameter of the felt ring should be cut with a certain amount of interference from the shaft, or in other words, the felt ring is given negative clearance. The exact amount of this interference varies primarily with the speed. Speeds of 900 feet or above but less than 2000 feet per minute, a ½ to 1 per cent interference fit should be provided. Above 2000 feet per minute the inside diameter of the felt washer should be equal to the shaft diameter or excessive heating may occur.

Designing the Proper Equipment for Extracting Ingots from Their Molds—by H. W. Ball, Assistant

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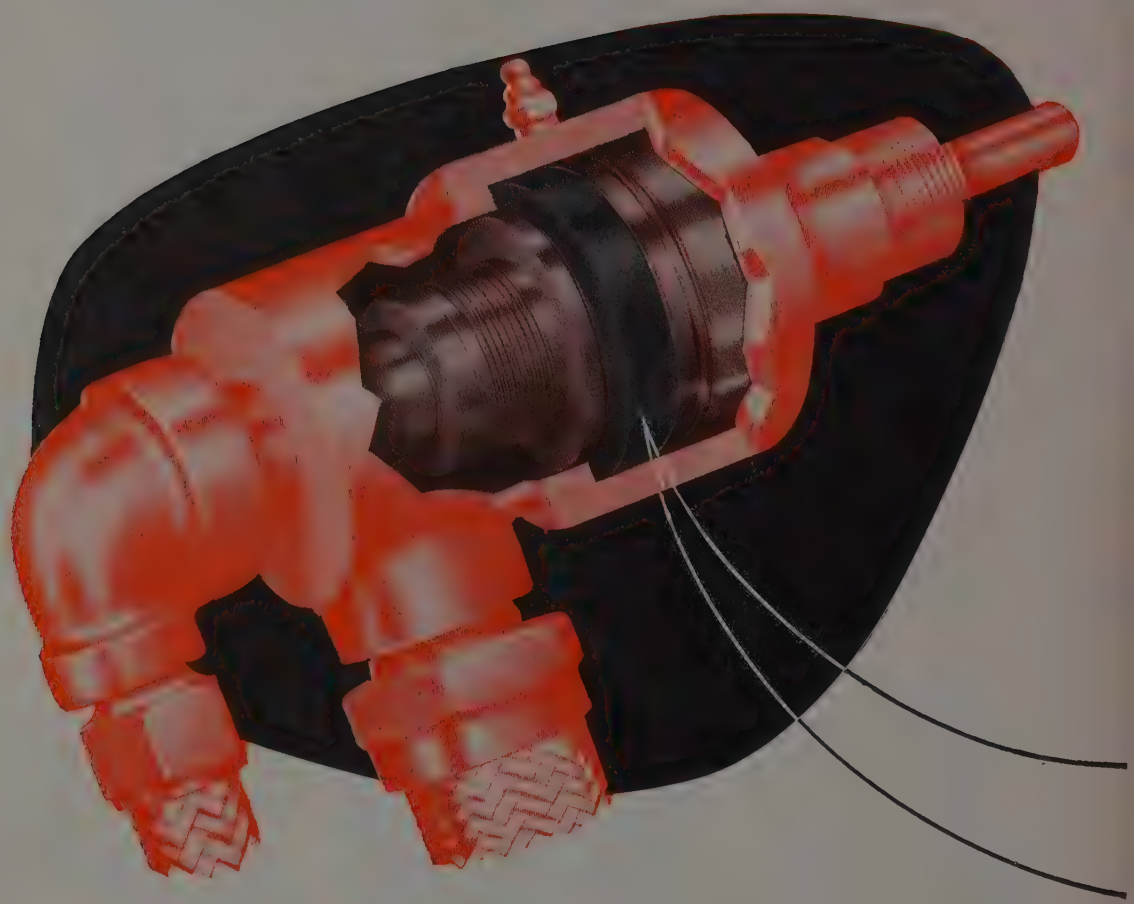

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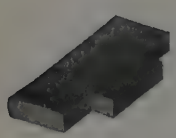

THE UNITED STATES GRAPHITE

ring seals high pressure steam, hot oil, liquids and gases in all-purpose ROTARY UNION

Whether or not a seal ring could be found that would hold gas and liquids at high and low temperatures, and under high pressures, *without frequent costly replacements*, could have spelled the difference between failure and success of this All-Purpose ROTARY UNION. The Perfecting Service Company of Chicago, Illinois, designed this union for all types of industry, to be used on drying rolls, calenders, waxing machines, etc. When they chose Graphitar seal rings, their problem was solved. Because Graphitar is self-lubricating and is chemically inert, it could *meet practically all types of industry conditions and still perform unfailingly*. Today, Graphitar seal rings are helping to make scores of industrial engineering problems simpler by contributing to the efficiency and dependability of the ROTARY UNION.

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Chief Engineer, Morgan Engineering Co., Alliance, O.: Normal lifting capacity on a stripper crane is on an average of 40 tons live load, or a total of about 65 tons when one includes the weight of the stripping mechanism. Its main strength lies in its ability to exert a force up to about maximum of 800 tons on a 200-ton rated stripper.

When designing the pull tongs of an electric overhead ingot stripper crane, there should be a ratio of not less than 1.25 to 1 between the range and the drop. This ratio will permit the tougher gripping force used in removing the ingot.

Hardened bits used on the tongs for gripping the ingot tend to break. This is likely due to the extreme heat encountered. One steel plant, using bits of special alloy steel, was able to employ these bits for a series of 11 months, handling about 15,000 pieces. Replacement was made only when the bits had been ground to a point beyond further utility.

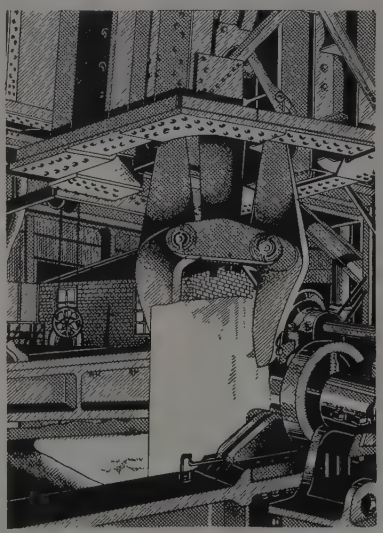
Maintenance of Hearths in Heating Furnace and Soaking Pits—by C. N. Jewart, Ceramic Engineer, Bethlehem Steel Co. Lackawanna, N. Y.: In 1936 when the strip mill was built at the Lackawanna plant, three zone controlled, triple fired, continuous, recuperative, slab reheating furnaces were installed. The soaking zones in these furnaces were 18 feet wide and 16 feet 9 inches long and made up of four rows of dry low-carbon steel skids placed about 3½ feet apart. The material between the skids was plastic chrome ore. These steel skids were lined up with wet skid at charge and discharge ends.

As a result of the experience encountered during the first year of operation, hearths were made with plastic chrome ore without the low-carbon steel skids which afforded an increased output per furnace per day from 500 tons in 1936 to over 1000 tons in 1942. However, in 1943, the life of these hearths showed a marked decrease. Some of the hearths lasted only 2½ months or had to be replaced after 60,000 tons had been charged. This sudden decrease in hearth life was attributed to a probable inferior quality of plastic chrome ore.

In 1944, in an effort to increase hearth life, slab reheating furnace hearths were installed with silicon carbide skids along with the plastic chrome ore. These skids were lined up with the wet skids at the charge and discharge ends. Use of the silicon carbide skids increased the tonnage per hearth from a low of 60,000 tons in 1943 to a high of 225,000 tons in 1944. The life of these silicon carbides skid bottoms varied, however, as any overheating of the slab would cause the scale to liquefy and react with the silicon carbide skids, dissolving them.

Some bottoms have been installed with six rows of alloy skids in place of four of them, but due to the variation of the size of slabs rolls some of these skids are exposed to the direct heat of the furnace a greater percentage of the time and seem to oxidize away. An alloy skid apparently gives the best results when it is covered continually with slabs.

Some trouble has been encountered with the alloy skid becoming knife-edged under the surface next to the plastic chrome ore, which may mean that the alkali in the plastic chrome ore is causing a breakdown of the



alloy. In future installations, it may be necessary therefore to specify a stabilized alloy or to put a fired refractory between the alloy skid and the plastic chrome ore. The experience at Lackawanna is that a plastic chrome ore hearth is easier to clean than a brick hearth. However, any chrome base refractory swells, due to iron oxide absorption.

Flash Welding of Wide Strip Steel—by F. R. Thompson and F. J. Waldschutz, Mesta Machine Co., Pittsburgh: The mechanical type welder is capable of producing joints that are strong as the parent metal. It makes possible a continuous flow of strip through the pickle line without the welds pulling apart or breaking. It permits the formation of large coils at the up coiler, consisting of three, four or five ordinary hot mill coils. These welded joints are strong enough to permit reducing strip in the tandem cold mills to 1/10 of the entering thickness, and to withstand any further working required for a sheet.

To eliminate troublesome sharp corners, an air-operated side clipping shear was designed as part of the welder equipment. This shear consists of two independent shear heads mounted on air-operated carriages suspended from an overhead beam on the welder. This arrangement lends itself to any width of strip. It clips out a crescent-shaped section, thereby removing all projections.

A recent development is a flash trimmer of the rotary type. It removes the flash down to the level of a lighter gage strip, but it requires accurate stopping of the strip in the trimming position. It is being further developed for tin plate gages.

Blast Furnace Practice at Fontana—by C. H. Lenhart, General Superintendent, Kaiser Co. Inc., Iron and Steel Division, Fontana, Calif.: Relatively weak coke used at Fontana has been found to be sensitive to variations in moisture content. There is a definite relationship between the moisture content of the coke and the way it stands up while traveling through the furnace. Coke containing moisture much higher than 3 per cent with normal quenching generally will cause furnace trouble such as hanging, loss of tuyeres, and coke messes.

In an effort to eliminate the undesirable quality of iron-bearing ores, crushing, screening, bedding, and sintering must be employed. It would be practically impossible to produce uniform basic iron if beneficiating equipment were not available.

Sinter produced from Vulcan ore is porous, a characteristic which encourages good gas-solid contacts in the furnace stack. Excessively high sintering temperatures are avoided as they produce a hard bulky sinter.

Operation at Fontana has definitely proved that by employing merely the very basic beneficiation processes, inferior and nonuniform raw materials can be used successfully in the production of pig iron.

Analytical and Experimental Studies of Ladle Hooks—by C. W. Muhlenbruch, Associate Professor of Civil Engineering, Northwestern Technological Institute, Evanston, Ill.: Tests of a hook fabricated with hot-driven rivets combined with edge welding and which has been in service for approximately six months before the date of testing showed a maximum temperature of approximately 1000 degrees Fahr. on the hook shank above the lip of the ladle after an unkilled heat had been lifted for six minutes. Increase in length of the hot side of the hook caused transverse bending as a result of the load being applied to the

plates on the cold side. Peak stresses were therefore higher than might normally be expected. Theoretical calculations and the observed data confirm this concept of the behavior of the hook.

Field tests of a new unwelded ladle hook which lifted a killed heat showed a maximum temperature of 250 degrees Fahr. Thermal stresses were not found to be important for this condition and transverse bending was not evident, indicating that the trunnion load was applied uniformly to the hook. Reduction or elimination of temperature stresses may be effected by placing a ¼-inch steel plate over the entire hook surface on the hot side.

Steel Temperature Measurement and Control of Billet-Heating Furnaces—by F. S. Bloom, Bloom Engineering Co., Inc., Pittsburgh: Control of the heating rate of continuous pusher-type heating furnace is not an easy process inasmuch as the rate of heating varies over wide limits from instantaneous peak demand to a standby delay.

Measurement of steel temperature in a triple fired furnace is approximately the same as that of measuring steel temperature in the smaller single or 2-zone top and bottom fired furnaces. Control from steel temperature measurement in the triple fired furnace is more difficult.

In the main heating zone it can be expected that the difference between two slabs, one in the back of the other can be as much as 120 degrees F. Thus, when the slab in back replaces the previous slab, the steel temperature must drop about 80 to 150 degrees F., depending upon the locating of the siding to. In the final heating zone of such a furnace, the steel temperature should be stable.

Slab thickness plays an important part in slab temperature, particularly since all slabs, if following one in back of the other, go through the same temperature cycle. Therefore, on the hearth of a furnace where slab thickness varies, it should not be expected that straight-line temperature record will be obtained readily.

Handling Strip Coils in Steel Mills—by B. I. Ulinski, Electric Industrial Truck Association, Chicago: Experience gained in years of truck manufacture is built into the newest truck units. New solid rubber, large diameter drive tires were developed to reduce the rolling resistance.

By previous experience it was found that wide faced tires 8 inches or over actually carried a load and lasted longer by having one or more continuous grooves about ¾-inch wide by 1 inch deep cut all around the tire thread. The explanation for this is that tire deformation, which occurs under loaded conditions, has a chance to flow in smaller units sideways with the grooves in the tread instead of forcing all displaced rubber to one side under tremendous internal resistance and outside grinding action. In addition, tiremakers contributed by developing rubber compounds that have little internal resistance and wear well on the oily floors encountered in steel mills.

Batteries of 800 ampere hours capacity or more and between 60 to 72 volts have proved satisfactory for 20,000 pound capacity units and 1000 ampere hours or more and between 60 and 72 volts are proving satisfactory for 30,000 capacity truck units. These heavy trucks are run more than 12 hours before recharging.

Forging Practice

(*Continued from Page* 104)

ture, flakes and segregation in the metal are some of the inspection problems of the metallurgical department.

Not all production forging plants are equipped with metallurgical laboratories or facilities. However, experienced metallurgists with suitable facilities are necessary in forging plants making high quality forgings such as aircraft parts. Where metallurgical facilities are available, some of the metallurgical inspections are included in the regular routine of inspection and others of the inspections are used only where required.

Chemical and visual inspection of all incoming forging stock is a routine matter in forging plants equipped with laboratory facilities. Samples are taken at random from each heat of steel or metal. The samples are checked for chemical composition to be sure no error has occurred in the mill analysis or that the steel or metal has been mixed in shipment. Samples are also inspected visually for seams and pipes, and if the composition is of a nature that is subject to flaking, samples are inspected under the microscope for flakes.

Flakes are very small internal bursts that can occur in some kinds of steel if the steel has not been properly cooled after the mill rolling operation. (Flakes can also occur in forgings if the heating and cooling cycles are not right.) There are instances where the identification on a pile of steel becomes lost and it may be necessary to make a check of the chemical composition. On occasions, errors can be detected and corrected by the normal routine chemical composition inspection and by normal visual inspection of the forging stock.

The modern forging laboratory is fully equipped to make macro and microinspections of forgings after the samples have been prepared properly. Preparation usually consists of cutting out or machining a sample specimen, polishing it to the correct degree for the specific inspection, and then etching the specimen in a suitable etchant. Macroinspection is the visual inspection of the prepared specimen by eye or under low-power (10X) magnification. Position and direction of the flow lines, small pipes, bursts, seams and porosity are some of the defects detected by macro-inspection.

Microinspection is the visual check of the prepared specimens under the microscope where the surface being inspected has been enlarged over ten times. Normal microinspection may be at 50, 100, 500 or at 1000 diameters enlargement. Position and size of grain structure, segregation, bursts, flakes, effect of heat treatment and detection of impurities are some of the items of microinspection. Macro and microinspections are routine procedures for special quality forgings such as are used for aircraft applications.

Magnetic Testing—Magnetic particle inspection of forgings is an inspection used to detect small surface defects of a size or nature that may not be found by the regular cold inspection, and to detect subsurface defects that are not visible in the regular cold inspection. The magnetic particle inspection procedure consists of magnetizing the forging and then covering the surface with very fine iron particles. The particles may be sprinkled on dry or they may be in a liquid suspension in which the forging is dipped. The fine iron particles will adhere to the surface of the forging at the points where there are small almost invisible surface cracks and at points where there are subsurface cracks.

Once the defects are located, the inspection department determines whether is is possible to salvage the forgings or whether it is necessary to consign them to scrap. Magnetic particle inspection is used on all ferrous aircraft forgings and the method is gaining use on other types of high quality forgings.

Fluorescent penetrant inspection is finding considerable use in the in-

spection of small and medium forgings to detect small and minute surface defects. The procedure is to cover the surface of the forging with a special solution after which the forging is taken for visual inspection under a black light. If there are minute surface defects, the solution has penetrated into the defects and the black light shows them up in a sort of a phosphorescent glow. Such defects are then removed and the inspection is repeated. If the defects are completely removed, there will be no further indications.

Physical Testing—Physical testing of specimens to destruction can be performed in many ways; use of any particular method depends upon the information desired. Tensile and notch impact tests are the two tests used for a large variety of forgings to determine their strength. The tensile test is the pulling apart of a test specimen in a machine which records the load at which the breaking occurred. The test indicates the tensile strength of the metal composition in pounds, telling how heavy a load is necessary to pull the metal apart. The result of the test is converted to the pounds of load for a square inch of metal area. Yield strength of specimen is also indicated. The yield strength is the load at which the metal will no longer return to its original length after being stretched. Percentage of elongation is obtained from the tensile specimen and also the percentage of reduction in cross-section area at the breaking line. Percent of elongation and percent of reduction in area indicate the relative ductility of the metal.

Test specimen may be cut out and taken from a forging or it may be machined from a forged test bar. The forged test bar is made from the same material that is used to make the forgings and it is given about the same amount of forging as is given the forgings themselves. Test specimens from a forging or from a forged test bar are machined to the standard tensile test specimen. The tensile test specimen is machined to a diameter of 0.505-inch for a straight length of 2 inches between ends and the balance of the specimen has a larger diameter at each end. The 0.505-inch diameter has an area of exactly 1/5-square inch so that the actual load on the tensile test indicator is multiplied by five to convert the result to pounds per square inch.

Notch impact tests are used to indicate toughness of metal under live loads such as impact, shock and fatigue. Two types of test specimens are used in general: Izod and Charpy. The Izod specimen is a square piece machined to exactly 0.3937-inch square, with V notch of definite size. One end of the specimen is placed in a holder with the notch just exposed. A pendulum hammer swings from a 90 degree arc to strike the exposed end of the specimen and break it. Force in foot pounds is recorded on a dial recorder.

The Charpy specimen is a similar piece machined to 0.394-inch square, with a "keyhole" type notch. Notch impact test results depend upon exacting conditions; results must be interpreted by a metallurgist.

Other tests may be used from time to time. Some of the infrequent tests may be shear, soundness, upset, x-ray, resonance, decarburization, grain size corrosion and the fatigue tests.

Special Inspections—Special inspections are used to cover conditions not normally specified on forgings. These may include close composition tolerances on the forging material, special surface conditions, close tolerances on the weight of the forging, or some other requirement that is special for the forging. Chemical composition to closer than normal tolerances is specified on the order to the mill furnishing the forging stock. The chemical composition is checked usually at the forging plant to be doubly sure conditions have been met.

Special surface conditions may require extra careful inspection of the surface during the processing operations, or it may make necessary a special forging technique to be sure of the surface conditions. The technique may be in the design of the forging operations or it may require special heating conditions. Close weight tolerances are specified for some types of forgings; where it is necessary to hold weight of the forging close, it is necessary to watch die wear closely. Also, each forging is weighed to be sure it is within the limits.

Overweight forgings may be corrected by a restriking operation. Once the forging is underweight, it is not possible to correct the condition. Forgings for pressure applications, such as a boiler manhole cover, are tested under hydrostatic pressure to determine the maximum working pressure under which they can be used.

(To be continued)

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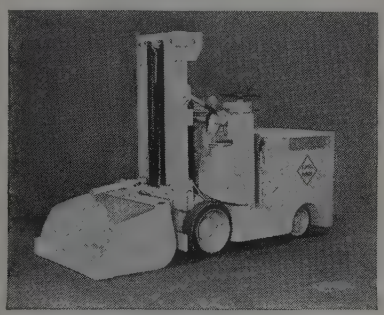
Recently published by Engineering Experiment Station, University of Illinois, is a bulletin entitled "Rate of Propagation of Fatigue Cracks in 12 x ¾-inch Steel Plates with Severe Geometrical Stress Raisers".

New Products and Equipment

Scoop Truck

Loose materials may be picked up, transported, delivered or piled with an electric power industrial truck equipped with a special scoop, announced by Elwell-Parker Electric Co., Cleveland, O. The scoop is attached to the truck's tilting and elevating mechanism and all controls are centralized at the driver's station. A tripping device provides for rapid



discharge of load. Lowering it to floor level restores it to normal shoveling position.

Upright column of the truck may be tilted forward 5 degrees or backward 15 degrees for safer carrying of the load. The scoop may be loaded or emptied at any level from floor level to a height of 117 inches. Capacity of the scoop is 12 cubic feet or 2000 pounds. Loaded truck speed ranges up to 5½ miles per hour. The scoop is interchangeable with a standard type fork.

Check No. 1 on Reply Card for more Details

Straightening Device

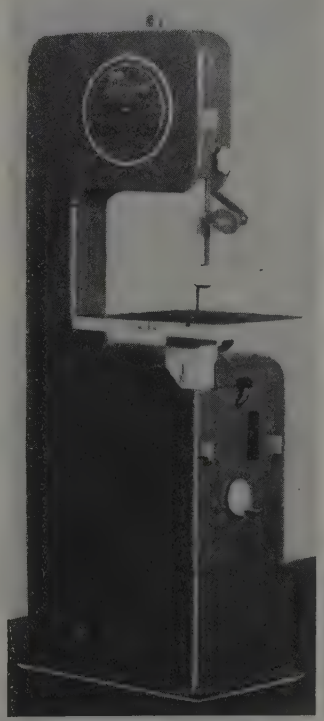
National Machinery Co., Tiffin, O., is introducing a hydraulic straightening machine for use with boltmakers, nut formers and other cold heading equipment using heavy wire or coiled hot rods which must be straightened before use. Down time caused when feeding a new coil of wire into a machine is reduced by mechanically straightening a length long enough to pass through the feed tube and rolls and supplying power to push the straightened length into the machine. A reserve coil may be prepared while the previous coil is still being fed.

Straightener consists of a car which travels on a track frame. The two drums holding the wire coils can revolve on a shaft held stationary in a spindle head mounted on the car. Gripping bars are mounted on one end of the stationary track frame. Both car and bars are hydraulically powered. The car moving on the track straightens a long length of wire. Movement of grips and car is controlled by two levers. Machines handling wire up to ¾, 1¼ and 1½-inches are made.

Check No. 2 on Reply Card for more Details

Band Saws

DoAll Co., Des Plaines, Ill., is producing a full size 16-inch sawing machine which is convertible from a single speed woodworking saw to a double range variable speed control machine, equipped for sawing, filing and polishing operations. The



buyer can purchase the saw that his operations demand, equipped as needed. Fast, accurate cutting of practically any material is possible with the general purpose machine.

Pressed steel shell encloses all working parts. The frame is rigid, arc welded over die forms and is integral with the shell structure. Motor and drive mechanism is isolated by a steel baffle plate. Throat depth is 16 inches and work thickness capacity is 12⅛-inches. Basic machine in Utility series is model HS, with one high set speed or two four-speed step pulley drive. Model HSV has a variable high speed range of 850-5200 feet per minute. Model LHV has both high and low variable speeds (50-300 and 850-5200 feet per minute). Model SFP is the same as the latter, but has extra equipment.

Check No. 3 on Reply Card for more Details

Tote Box Truck

Feature of the Hook-'N-Haul truck for tote boxes, cases and boxes, made by Techtmann Industries, 714 West Wisconsin Ave., Milwaukee 1, Wis., is a double hook which enables the hook-arm to bite into totally closed wood boxes or cases. The upper hook

on the arm takes hold of handles on metal tote boxes. Manipulation of the hook-arm is by the hand grip on the arm itself.

When the load is hooked the operator pulls backward and the load slides onto the balanced tilting carrier plate. To discharge, a slight push with the hook-arm overbalances the carrier plate and allows the load to slide to the floor. Of all steel welded construction, the truck has one swivel and two stationary casters, either steel or rubber.

Check No. 4 on Reply Card for more Details

Lift Truck Scale

A LaRay cantilever type scale with a capacity of 1 to 2½-tons is being manufactured by Weishor Corp., 1029 North Seventh St., Milwaukee, Wis., for permanent attachment to virtually any make of lift truck. The unit makes it unnecessary to transfer palletized loads from lift truck to scale and back again. The tare bars are mounted at eye level.

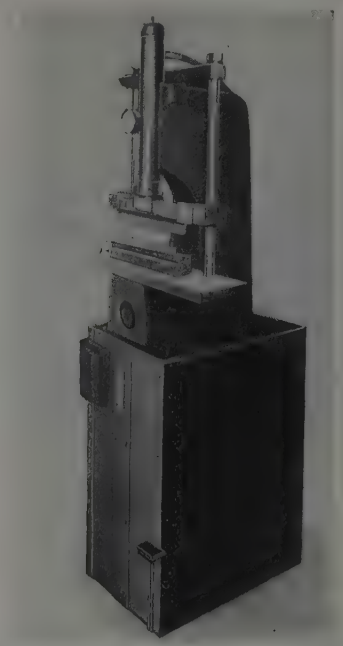
Check No. 5 on Reply Card for more Details

Press Brake

Munton Mfg. Co., 9400 West Belmont Ave., Franklin Park, Ill., is introducing a hydraulic press brake, available in three sizes and readily convertible to a press. Ninety de-

gree bends may be made in mild steel. The 10-ton model handles 18-gage stock 3 feet long, 14-gage stock 2 feet long and 10-gage stock 1 foot long. The 20-ton model handles 12-gage stock 3 feet long while the 30-ton model handles 10-gage 3 feet long.

Illustrated is the 10-ton hydraulic press brake with spring return. It is used for forming only, unless the die



sets have springs to brake punch and die. The dual cylinder model which provides pressure down and up, is recommended for punching, broaching, pressing, etc. Press has a 9-inch throat between guide rods which are 20 inches apart and a 3-inch throat from guide rods out. Conversion to a press is by removing cross rods, tie rods and bed. Equipment includes pump, motor, cylinder, gage and connections.

Check No. 6 on Reply Card for more Details

Welder Control

Weltronic Co., 19508 West Eight Mile Rd., Detroit 19, Mich., is manufacturing a nonsychronous control combination for foot operated spot, projection and butt welders. Known as Series K, the control provides simplified installation by combining the main line disconnect switch within the unit. It is offered in floor, side-of-welder and wall mounting types. The cabinet houses a NEMA 1A, 3B or 5B timer, fusible or nonfusible disconnect switch, line fuses and an Ignitron contactor.

Timer panel is of "plug-in, swing-out" construction. Opening of front panel provides easy access to resis-

One of a series *of messages to help you increase your understanding of business paper advertising, and its effect on your job.*

You know more about advertising than you think !

IF YOU UNDERSTAND the basic principles of mass production —

If you're on familiar ground when it comes to time-motion studies, obsolescence curves, and assembly-line techniques —

If you regard every operation in your plant as a challenge to further reduce your manufacturing cost-per-unit —

Then you know a lot more about advertising than you think. Yes, *advertising!*

For basically, advertising is the application of assembly-line techniques to the *manufacture of a sale.* And how are sales manufactured? Like any other commodity, by sequence of "processing operations." In this case they include —

1. **Seeking out prospects**
2. **Arousing their interest**
3. **Creating a preference for your product**
4. **Making a specific proposal**
5. **Closing the order**

Couldn't your salesmen handle this entire sequence? Certainly — if you had *enough* salesmen, and weren't concerned about the cost. But no salesman should *have* to spend his valuable time on missionary work. Not when those first three steps can be *mechanized* for him — not when they can be handled so much more economically — through the efficient use of business paper advertising.

Why *business* papers? Because nowhere does your advertising work more efficiently than in the business publications which reach your best prospects. Nowhere else can "mechanized selling" contribute so much toward reducing the cost of manufacturing a sale!

STEEL

is a member of The Associated Business Papers, who have published an interesting folder entitled, "10 ways to measure advertising effectiveness." We'll be glad to send you a copy. And if you'd like reprints of this advertisement (or the entire series) to pass along to others in your organization, just say the word.

tors, condenser, transformer and wiring. Each time period is independently adjustable. Power supply unit is universal for all timers and operates on 208, 230, 380, 460 or 575 volt

power source. Ignitron tube contactor accommodates two A, B or C tubes and includes internal water lines and connections, buss supports, thermal flow switch, fuses and surge suppressor.

Check No. 7 on Reply Card for more Details

Automatic Units

W. K. Millholland Machinery Co., 1048 Fairfield Ave., Indianapolis 5, Ind., is manufacturing automatic drilling, tapping and milling units which are self-contained and easily mounted, making them adaptable for custom-built production machinery. The No. 5 unit is mounted in an ad-

justable sub-base and with a 7½-horsepower motor drive, although it is rated at 10 horsepower. It has a maximum stroke of 6 inches, a spindle with a No. 5 Morse taper (or arranged for multiple head drive) and an automatic cycle which keeps tools producing 80 to 85 per cent of the time.

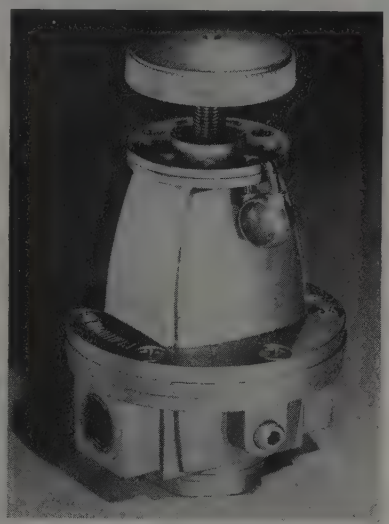
Rapid advance, numerous feeds, dwell and rapid return are available. Brown & Sharpe type plate cams are used with an air counterbalance to

keep cam roller tightly on surface of cam at all times and to return spindle quill back to rest position. Spindle construction has double-row combination radial and thrust ball bearings. Geared spindle reduction or V-belt drive are offered. A safety clutch which drives camshaft prevents damage to tools or spindle by kicking out under excess load.

Check No. 8 on Reply Card for more Details

Air Pressure Regulators

Designed for specific applications on compressed air supply lines are the series PRD and LRD air pressure regulators manufactured by Hannifin Corp., 1101 South Kilbourn Ave., Chicago 24, Ill. The PRD series is equipped with a flange for panel



mounting where the adjusting knob extends through to the front of an instrument board, while the valve itself is back of the board for convenience in making pipe connections.

Series LRD regulators are for installations where it is desirable to lock the adjusting knob against unauthorized change of pressure setting, this being accomplished by passing a common padlock through holes in two parallel disks. The disk arrangement provides 36 possible locking combinations. Both series are available in ⅜ and ½-inch sizes for primary and secondary pressures to 150 and from 5 to 125 pounds per square inch, respectively.

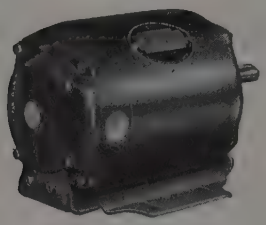
Check No. 9 on Reply Card for more Details

Motor Mounting Base

Two extra-large, square-block rubber cushions encased in steel cradles inside the motor end covers instead of on the outside feature the resilient mounting base for fractional horsepower motors built by Brown-Brock-

meyer Co., Box 976, Dayton, O. The inbuilt cushions are protected from mechanical damage and deterioration.

Valuable space is saved by mounting the cushions inside the motor



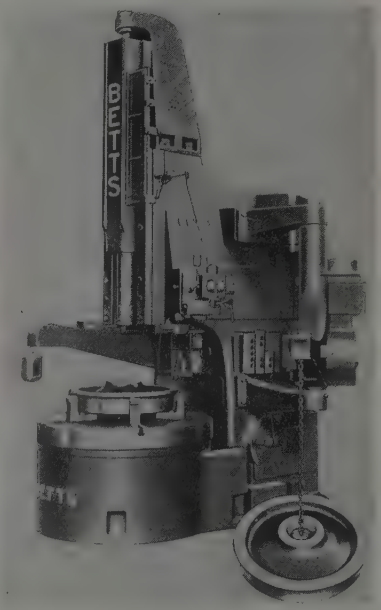
frame. A high degree of resiliency and silent operation are attained. Cushions are available in motor ratings from 1/6 to 3/4 horsepower.

Check No. 10 on Reply Card for more Details

Car Wheel Borer

Among the features of the high speed Betts hydraulic feed car wheel boring and hub facing machine, built by Consolidated Machine Tool Corp., Rochester, N. Y., are automatic table brake in conjunction with automatic feed and traverse cycle, Timken table spindle bearings and antifriction bearings throughout the drive. The machine table stops automatically before the spindle starts its upward traverse.

Machine is provided with high speeds for use of carbide tools as

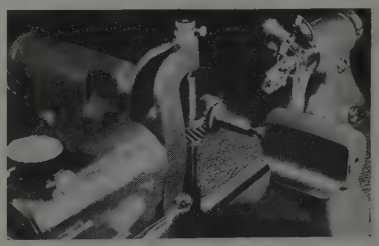


well as suitable range for high speed steel tools. It also has automatic speed reduction between roughing and finishing speeds when desired, making it possible to combine carbide and steel tooling. Capacity is 17 to 48 inch cast iron or steel wheels using a 5-jaw self-centering chuck. It is shown equipped with two electric hoists, but one or two electric or pneumatic hoists may be furnished.

Check No. 11 on Reply Card for more Details

Gear Checker Head

National Broach & Machine Co., 5600 St. Jean, Detroit 13, Mich., is manufacturing the Red Ring checking head for determining the helix angle wobble of a gear, its size, ec-



centricity and roughness of roll. The checking is performed simultaneously or separately by rolling the work gear with a master gear under predetermined pressure.

Spindle which carries the master

gear holder is mounted in a yoke which may be rotated through 90 degrees. Either conventional or 90 degree drive gears may be checked with the same facility. Displacements when the gears are rolled together are measured by dial indicators located on the head behind the spindle yoke. The head may be used on any of the standard Red Ring gear checkers.

Check No. 12 on Reply Card for more Details

Molding Press

F. J. Stokes Machine Co., 5900 Tabor Rd., Philadelphia, Pa., has developed 200 and 300 ton model heavy duty plunger presses for transfer and compression molding. Designed for high speed precision and intricate work, such as insert jobs and parts with thick or thin sections or projections, the presses have 40 and 60 ton injection pressure, respectively.

Platen areas are 26 x 23 and 36 x 28 inches. Both models feature a toggle lock which holds the mold shut during injection, minimizing the chance of the mold opening up and causing rejects when overloaded. In each case independent pressure control in both transfer and clamping cylinders is possible. Compact power units have simple, accessible hydraulic equipment and develop high ram speeds.

Check No. 13 on Reply Card for more Details

Punch Press

Featuring an 18-inch throat which permits working to the center of 36-inch sheets, the No. 2-G Rousselle

deep throat press, made by Service Machine Co., 7627 South Ashland Ave., Chicago 20, Ill., has a 15-ton capacity. Its bolster plate measures 11 x 16 inches and the shut die height is 7-3/4 inches to the bed. Press has a standard 2-inch stroke.

Frame of the press is a one-piece semisteel alloyed casting of sufficient proportion to provide rigidity and strength. The frame is designed so that the bed protrudes, allowing clearance for some jobs that would require horn presses. Press is equipped with a single stroke or continuous clutch, roller bearing flywheel, large air-cooled brake and hinged motor mount. It operates at 200 revolutions per minute with a 1 horsepower, 1750 revolutions per minute motor.

Check No. 14 on Reply Card for more Details

Table Extensions

Extension parallels, intended to increase the effective table size of jig borers and jig grinders made by Moore Special Tool Co., Bridgeport, Conn., are announced by that company. Furnished in sets of four, they will accommodate work almost twice table size with no loss in accuracy of table settings. The parallels, made of Meehanite, give ample drill clearance and T-slots are provided for clamping dies in place. Parallels measure 3 x 2 x 10 inches.

Jig grinder models 1 and 2 can accommodate work 5 inches larger than

table size in both directions or work 10 inches larger in only one direction. When extension parallels are applied to the 10-inch rotary table for circular parts, used with all three machine tools, rings more than 20 inches in diameter can be handled.

Check No. 15 on Reply Card for more Details

Welding Equipment Truck

Carrying welding equipment from one part of a factory to another, the battery powered motorized hand truck, the Transwelder, made by

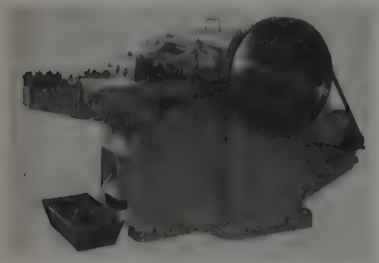
Automatic Transportation Co., 149 West 87th St., Chicago, Ill., is an adaptation of the company's Transporter truck.

Truck consists of a Transporter chassis, plus a rack in which are mounted all tanks, rods, tools and essential equipment for acetylene welding. Space is provided for a fire extinguisher. In addition, the unit pulls the electric welder.

Check No. 16 on Reply Card for more Details

Nail Making Machine

Designed so that noise and vibration are reduced to a minimum, the model DA nail making machine, manufactured by Black Industries, 1400 East 222nd St., Cleveland, O., is of



all-steel construction and has cams, crankshaft and feed mechanism pressure lubricated. The circular cross-head floats on a film of oil. The heat treated alloy steel crankshaft is counterbalanced, fully enclosed and supported at four points by steel-backed cadmium silver bearings.

A delayed feed action does not allow the wire to be gripped until it is fully stopped. The length of feed covering the range of sizes from 1/2 to 2-3/4-inch nails is adjustable while the machine is in operation. No. 10 to 14 gage wire may be used. Machine is operated by a 5-horsepower motor through v-belts to a safety shielded flywheel.

Check No. 17 on Reply Card for more Details

• • •

REMOVER: Composition No. 15, made by Oakite Products Inc., New York 6, N. Y., is a cold solvent material designed to permit fast, thorough removal of paint and similar finishes from metal surfaces. Used at room temperature, it may be applied by tank immersion method or by swabbing or brushing.

Check No. 18 on Reply Card for more Details

WIRING INSPECTOR'S TEST SET: Device is housed in a gray fiber carrying case and weighs 13 pounds. A compartment provides storage space for flexible leads and portable meter. Power is supplied from a standard 6 volt dry cell. This set, made by Eastern Specialty Co., Philadelphia 40, Pa., enables one person to make a complete test of wiring in a building.

Check No. 19 on Reply Card for more Details

ACID PROOF LINING: An acid and alkali proof lining for fume carrying ducts is offered by Ceilcote Co., Cleveland, O. Known as Ceilcote Spray Grade, it has a maximum temperature resistance of 300° F and bonds to either wood or metal. Application is by a special spray equipment.

Check No. 20 on Reply Card for more Details

LIFTING MAGNETS: Cutler-Hammer Inc., Milwaukee 1, Wis., announce lifting magnets that can be mounted on anything that moves having a boom and source of electric power. These magnets provide fast, easy and economical method of handling castings, borings, turnings, pig iron, car wheel, steel shafting, etc.

Check No. 21 on Reply Card for more Details

DIAMOND PENETRATORS: The C diamond penetrator fits all makes of hardness testers for standard rockwell testing and the S type fits all machines for superficial rockwell testing. It is furnished as a standard accessory on hardness testers, both for standard and superficial rockwell testing, made by Clark Instrument Inc., Dearborn, Mich.

Check No. 22 on Reply Card for more Details

DISK BRAKE: Series X-60 magnetic disk brake, announced by Stearns Magnetic Mfg. Co., Milwaukee 4, Wis., is suitable for 1/6, ¼, 1/3, ½ and ¾ horsepower use. It is offered for continuous or intermittent duty, for alternating or direct current and is adaptable for motor or floor mounting and for horizontal or vertical operation.

Check No. 23 on Reply Card for more Details

WARM AIR UNIT HEATER: Designed for heating and ventilating of industrial and commercial buildings, the heater can be used for process work and make-up air applications. Fuel can be oil, gas or coal. Capacities range from 300,000 to 2,000,000 Btu in the gas or oil fired package unit; 500,000 to 2,000,000 Btu in the stoker fired unit. In the central type which can be used with stoker, heavy oil, gas or other type of fuel, capacities range from 2,500,000 to 6,000,000 Btu. Units are manufactured by Arthur A. Olson & Co., Canfield, Ohio.

Check No. 24 on Reply Card for more Details

ELECTRIC BENCH GRINDER: No. 128 electric bench grinder, developed by Speedway Mfg. Co., Cicero, Ill., has 6 x ¾-inch grinding wheels that are operated by a 1/4 horsepower air cooled motor. The tool rests are adjustable to compensate for wheel wear and have built-in side guides of preset angles that simplify proper grinding of tools.

Check No. 25 on Reply Card for more Details

ELECTRODE: Air Reduction Sales Co., New York, N. Y. announces a new silicon bronze electrode that may be used for welding of silicon bronze base metal, copper and for joining galvanized iron and silicon bronze to steel. It is available in 5 diameters ranging from 3/32 to ¼-inch varying in length from 11 to 18 inches.

Check No. 26 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

PRODUCTION— Steel ingot output started off the new quarter at a rate, which if maintained, will push production for the closing three months of the year to the highest level of all times, or well above the existing record of 22,600,000 tons established in the first quarter this year.

This may be too much to expect, particularly in the light of year-end holidays. Nevertheless, there is a good prospect that the current quarter's production may exceed the peacetime record established earlier this year. Meanwhile, conservative estimates now place production for the entire year at 87 million tons, a peacetime record, and the third largest annual output in history, being exceeded only in 1944 and in 1943, both war years, when output totaled 89,600,000 tons and 88,800,000 tons, respectively.

CAPACITY— Steelmakers are adding steadily to production facilities. Ingot capacity continues to expand with the possibility that by shortly after the turn of the year at least, capacity will hover around the 95,500,000 ton all-time record established in 1945. Ingot capacity as of the beginning of this year slightly exceeded 94,200,000 tons.

With this year's steel output estimated at 87 million tons, or possibly a little more, ingot capacity is still keeping well ahead of actual production. This situation reflects continued stringency in raw materials, difficulty in carrying on maintenance and repairs at a normal rate, and sporadic labor disturbances. Contributing to the expansion in ingot capacity are not only new facilities but, more importantly, various technological improvements beginning with the processing of raw materials.

In finished steel, production is pressing capacity in certain lines, particularly pipe. However, in sheets, and even in plates, both especially scarce items, rolling facilities still exceed actual production.

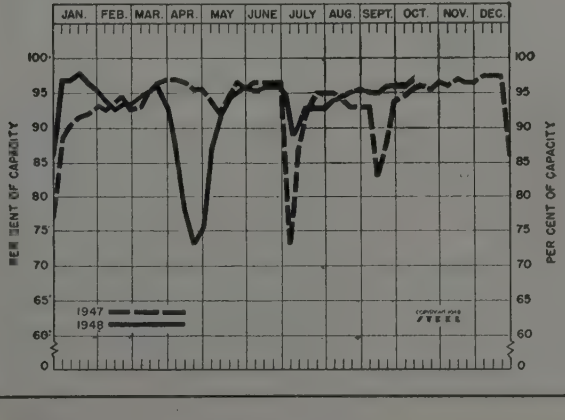
PRICES— Considerable speculation with respect to the immediate future trend of steel prices has followed in the wake of a general advance in pig iron prices last week, averaging about $3 per ton. However, steel sellers, generally, insist no early increase in finished steel prices is in prospect even though production costs have continued to rise. The upward adjustment in pig iron started two weeks ago when an eastern producer advanced prices. It is attributable to higher production costs, including freight rates. Gap between the prices quoted on domestic iron and imported material is extremely wide, with some buyers reported paying over $100 per ton for foreign metal.

PRICE COMPOSITES— STEEL's arithmetical price composite on steelmaking pig iron increased last week to $45.88 from $44.94 for the preceding week, and compared with $36.13 for the like week a year ago. Other price composites held unchanged from the preceding week and compare with the like week a year ago as follows: Finished steel, $95.05 and $75.41; semifinished steel, $75.75 and $56.80; steelmaking scrap, $43.33 and $37.92.

DEMAND— No sign of any easing in steel demand has yet developed. In fact, the situation appears tighter in some directions than at any time since end of the war. Voluntary allocations to preferred programs have cut severely into supplies available to nonpreference customers.

Last week the Office of Industry Co-operation turned down several pending requests for allocations, though it amended three existing programs to provide for their extension beyond Feb. 28, and approved the request for additional tonnage for warm air heating furnaces. Of 9 proposed new programs submitted to the steel committee only one was accepted, providing 10,000 tons monthly during January and February for shipbuilding, four were rejected and four were tabled for further consideration.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Oct. 9	Change	Same Week 1947	Same Week 1946
Pittsburgh	96	+ 1	103	97.5
Chicago	97.5	+ 0.5	95	91
Eastern Pa.	94	+ 1	91.5	78
Youngstown	104	+ 1	92	90
Wheeling	90	— 3.5	93.5	93.5
Cleveland	92	— 5.5	92.5	87.5
Buffalo	104	None	88.5	90.5
Birmingham	100	None	99	99
New England	87	+ 3	84	92
Cincinnati	103	+ 1	87	84
St. Louis	91.5	None	80	72.5
Detroit	101	None	88	60
Estimated national rate	97	+ 1	95.5	90

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Oct. 9	Oct. 2	Month Ago Sept. 1948	Year Ago Oct. 1947	5 Years Ago Oct. 1943
Finished Steel	$95.05	$95.05	$95.05	$75.41	$56.73
Semifinished Steel	75.75	75.75	75.75	56.80	36.00
Steelmaking Pig Iron	45.88	44.94	44.39	36.18	23.00
Steelmaking Scrap	43.33	43.33	43.33	39.85	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Sept. 1948	4.12679c
Aug. 1948	4.12032c
July 1948	4.06995c
Sept. 1947	3.45716c
Sept. 1943	2.44293c

***STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (re-rolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

†FINISHED STEEL WEIGHTED COMPOSITE: Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. August and September, 1948, figures are preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, wire rods, cents per lb; semifinished (except wire rods) and coke, dollars three months and one year ago. Finished material (except tin plate) and per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materiarls

	Oct. 9, 1948	Sept., 1948	July, 1948	Oct., 1947
Steel bars, Pittsburgh mills	3.45c	3.45c	3.105c	2.90c
Steel bars, del. Philadelphia	3.79	3.79	3.545	3.301
Steel bars, Chicago mills	3.35	3.35	3.065	2.90
Shapes, Pittsburgh mills	3.275	3.275	2.975	2.80
Shapes, Chicago mills	3.25	3.25	2.965	2.80
Shapes, del. Philadelphia	3.48	3.48	3.18	2.947
Plates, Pittsburgh mills	3.50	3.50	3.155	2.95
Plates, Chicago mills	3.40	3.40	3.115	2.95
Plates, del. Philadelphia	3.71	3.71	3.41	3.162
Sheets, hot-rolled, Pittsburgh mills.	3.275	3.275	2.975	2.80
Sheets, cold-rolled, Pittsburgh	4.00	4.00	3.70	3.55
Sheets, No. 10 galv., Pittsburgh	4.40	4.40	4.10	3.90
Sheets, hot-rolled, Gary mills	3.25	3.25	2.965	2.80
Sheets, cold-rolled, Gary mills	4.00	4.00	3.70	3.55
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.10	3.90
Strip, hot-rolled, Pittsburgh mills.	3.50	3.50	3.140	2.80
Strip, cold-rolled, Pittsburgh mills.	4.375	4.375	3.965	3.55
Bright basic, wire, Pittsburgh	4.325	4.325	3.965	3.675
Wire nails, Pittsburgh mills	5.775	5.775	5.255	4.25
Tin plate, per base box, Pitts. dist.	$6.70	$6.80	$6.74	$5.75

Semifinished

Sheet bars, mill	$67.00*	$67.00*	$62.80	$53.57
Slabs, Chicago	52.00	52.00	47.80	40.18
Rerolling billets, Pittsburgh	59.00	59.00	47.80	40.18
Wire rod 7/32 to ¼-inch, Pitts. dist.	3.775c	3.775c	3.415c	2.925c

* Nominal.

Pig Iron

	Oct. 9, 1948	Sept., 1948	July, 1948	Oct., 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$48.08	$48.08	$44.08	$38.879
Basic, Valley	46.00	43.00	40.60	36.00
Basic, eastern del. Philadelphia	50.17	47.77	43.77	38.78
No. 2 fdry., del. Pgh. (N.&S. sides)	47.58	47.58	43.58	37.379
No. 2 fdry., del. Philadelphia	50.67	48.27	44.27	39.28
No. 2 foundry, Chicago	44.75	43.25	41.10	36.00
No. 2 foundry, Valley	46.50	43.50	41.10	36.50
Southern No. 2 Birmingham	43.38	43.38	40.72	34.88
Southern No. 2 del. Cincinnati	49.09	49.09	46.43	38.544
Malleable, Valley	46.50	43.50	40.30	36.50
Malleable, Chicago	45.00	43.50	41.50	36.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	62.00	59.60	46.40
Ferromanganese, fob Aetna, Pa.	163.00	148.00	151.15*	151.00*

* F.o.b. cars Pittsburgh.

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$42.75	$42.75	$40.75	$39.90
Heavy melt. steel, No. 2, E. Pa.	41.50	41.50	40.00	39.50
Heavy melt. steel, No. 1 Chicago	41.75	41.75	40.05	39.55
Heavy melt. steel, No. 1 Valley	42.75	42.75	40.75	39.50
Heavy melt, steel, No. 1, Cleveland	42.25	42.25	40.25	38.25
Heavy melt. steel, No. 1 Buffalo	43.25	43.15	44.30	39.00
Rails for rerolling, Chicago	64.50	64.50	57.80	51.00
No. 1 cast, Chicago	70.50	71.10	68.50	46.40

Coke

Connellsville, beehive furnace	$14.50	$14.50	$14.25	$12.15
Connellsville, beehive foundry	17.00	17.00	17.00	14.50
Chicago, oven foundry, ovens	20.40	20.40	19.86	17.50

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $100-105 per gross ton. Forging quality $50 per net ton, mill.

Alloy Steel Ingots: $51 per net ton, mill.

Rerolling Billets, Blooms, Slabs: $52 per net ton, mill, except $62, Conshohocken, Pa.; $66, Monessen, Pa.; sales by smaller interests on negotiated basis at $85 per gross ton, or higher.

Forging Quality Billets, Blooms, Slabs: $61 per net ton, mill, except: $68, Conshohocken, Pa., mill.

Alloy Billets, Slabs, Blooms: Rerolling quality, $63 per net ton, mill, except: $70, Conshohocken, Pa.

Sheet Bars: $67 nom., per net ton, mill; sales in open market $110-$115 per gross ton.

Skelp: 3.25c per lb, mill.

Tube Rounds: $76 per net ton, mill; some sellers quoting up to $120 per gross ton.

Wire Rods: Basic and acid open-hearth, 7/32 & ⅜-inch, inclusive, 3.40c per lb, mill, except: 3.65c, Struthers, O.; 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.10c, Portsmouth, O., Los Angeles; 4.15c, Monessen, Pa. One producer quotes 3.90c, Chicago base. Basic open-hearth and bessemer, not resulphurized, 7/32 to 47/64-inch, inclusive, 3.50c, mill.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in. (Base 20 tons one size): 3.35c, mill, except: 3.55c, Ecorse, Mich., Pittsburgh, Monessen, Aliquippa, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif., Portland, Oreg., Atlanta, Seattle; 4.20c, Kansas City, Mo.; 4.25c, Minnequa, Colo.; 5.30c, Fontana, Calif.

Rail Steel Bars: (Base 10 tons): 3.35c, Moline, Ill.; 4.80c, Williamsport, Avis, Pa.

Hot-Rolled Alloy Bars: 3.75c, mill, except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 5.50c, Fontana, Calif.

Hot-Rolled Alloy Bar Shapes: 4.00c, mill.

Cold-Finished Carbon Bars (Base 20,000-39,999 lb): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.25c, Monessen, Pa.; 4.30c, Ecorse, Mich.; 4.35c, St. Louis; 4.36c, Plymouth, Mich.; 4.40c, Newark, N. J., Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.45c, Camden, N. J.; 5.30c, Los Angeles.

Cold-Finished Alloy Bars: 4.65c, mill, except: 4.75c, Monessen, Pa.; 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford, Conn.

High-Strength, Low-Alloy Bars: 5.10c, mill, except: 5.40c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 3.55c, Monessen, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, Atlanta, Seattle, S. San Francisco, Los Angeles; 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.10c, Pittsburgh; 4.25c, S. Duquesne, Pa., Gary, Ind., Youngstown; 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 4.65c, Williamsport, Pa., mill; 5.25c, Huntington, W. Va.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa., 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18 gage and heavier): 3.25c, mill, except: 3.25-3.30c, Cleveland; 3.30c, Pittsburgh; 3.45c, Ecorse, Mich.; 3.95c, Pittsburg, Torrance, Calif.; 5.00c, Conshohocken, Pa.; 5.65c, Fontana, Calif.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 4.65c, Niles, O., 5.05c, Torrance, Calif., Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Granite City, Ill., Ecorse, Mich., 4.95c, Pittsburg, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill, except: 5.00c, Niles, O.; 5.15c, Pittsburg, Torrance, Calif.; 5.30c, Kokomo, Ind.

Galvannealed Sheets: 4.95c, mill, except: 5.05c, Indiana Harbor, Ind.; 5.55c, Niles, O.; 5.70c, Kokomo, Ind.

Culvert Sheets, No. 16 flat Copper Steel (based on 5-cent zinc) 5.00c, mill, except: 5.40c, Granite City, Ill.; 5.45c, Kokomo, Ind.; 5.75c, Pittsburg, Torrance, Calif.
Copper-Iron: 5.75c, Granite City, Ill.; 5.35c, Irvin, Pa., Gary, Ind.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: 7.75c, mill.

Long Ternes, No. 10 (Commercial quality): 4.80c, mill.

Long Ternes Ingot Iron: 5.20c, mill.

Enameling Sheets, No. 12: 4.40c, mill, except: 4.60c, Granite City, Ill.; 4.70c, Ecorse, Mich.; 6.00c, Niles, O.

Silicon Sheets, No. 24: Field: 5.15c, mill. Armature: 5.45c, mill, except: 6.05c, Niles, O. Electrical: Hot-rolled, 5.95c, mill, except: 6.05c, Kokomo, Ind.; 6.15c, Granite City, Ill.; 6.55c, Niles, O.
Motor: 6.70c, mill except: 6.90c, Granite City. Dynamo: 7.50c, mill, except: 7.40c, Follansbee, W. Va., Toronto, O.; 7.70c, Granite City, Ill. Transformer 72, 8.05c, mill, except: 7.90c, Follansbee, W. Va., Toronto, O. 65, 8.60c, mill. 58, 9.30c, mill. 52, 10.10c, mill.

High-Strength Low-Alloy Sheets: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., and Conshohocken, Pa., mills.
Galvanized (No. 10), 6.75c, mill.
Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich.

Strip

Hot-Rolled Strip: 3.25c mill, except: 3.30c, Cleveland, Pittsburgh, Riverdale, Ill.; 3.25-3.35c,* Sharon, Pa.; 3.45c, Ecorse, Mich., Atlanta; 3.60c, Detroit; 3.70c, West Leechburg, Pa.; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, S. San Francisco, Los Angeles; 4.20c, Kansas City, Mo.; 4.30c, Minnequa, Colo.; 5.90c, Fontana, Calif.

* Wider than 6-in. and 6-in. and narrower, respectively.

Cold-Rolled Strip (0.25 carbon and less): 4.00c, mill, except 4.00-4.25c, Warren, O.; 4.00-4.50c, Youngstown; 4.20c, Ecorse, Mich.; 4.25c, Riverdale, Ill.; 4.40-4.50c, Detroit; 4.50c, New Haven, Conn., West Leechburg, New Castle, Pa., Boston; 4.75c, Dover, O.; 4.50-5.00c, Trenton, N. J.; 4.75c, Kensington, Pa.; 4.80-5.05c, Wallingford, Conn.; 5.75c, Los Angeles; 7.10c, Fontana, Calif.

Cold-Rolled Alloy Strip: 9.50c, mill, except 9.80c, Worcester, Mass.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., mill. Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich., mill.

Tin, Terne Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $6.60-$6.80; 1.50 lb coating $6.80-$7.00. Pittsburg, Calif., mill $7.35 and $7.55, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb. 0.25 lb tin, $5.80-$6.00; 0.50 lb tin, $6.00-$6.20; 0.75 lb tin, $6.20-$6.40.

Can Making Black Plate: Per base box of 100 lb. 55 to 70 lb basis weight, $5.20-$5.30; 75 to 95 lb basis weight, $5.10-$5.20; 100 to 128 lb basis weight, $5.20-$5.30. $5.75-$5.95, $5.65-$5.85, $5.75-$5.95, respectively, Pittsburg, Calif.

Holloware Enameling Black Plate: 29-gage, 4.75c per pound, except: 4.85c, Sparrows Point, Md.; 4.95c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $5.90-$6.00.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, $15.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.40-3.60c, Cleveland; 3.45c, Sparrows Point, Md.; 3.60c, Pittsburgh; 3.65c, Ecorse, Mich.; 3.75c, Coatesville, Pa.; 3.95c, Claymont, Del., Conshohocken, Pa.; 4.30c, Seattle, Minnequa, Colo.; 4.56c, Houston, Tex.; 5.80c, Fontana, Calif.; 5.85c, Harrisburg, Pa.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 5.10c, Coatesville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.10c, Coatesville, Pa.; 5.30c, Conshohocken, Pa., Sparrows Point, Md., Johnstown, Pa.; 5.65c, Ecorse, Mich., Sharon, Pa.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Pa., Lackawanna, N. Y., Johnstown, Aliquippa, Pa.; 3.35c, Torrance, Calif.; 4.15c, Minnequa, Colo.; 4.30c, Seattle, S. San Francisco, Los Angeles; 5.75c, Fontana, Calif.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill, except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.00c, Atlanta; 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Monessen, Pa., Minnequa, Colo., Buffalo; 4.70c, Portsmouth, O.; 4.80c, Palmer, Mass.; 5.10c, Pittsburg, Calif.; 5.15c, So. San Francisco; 5.40c, Shelton, Conn. One producer quotes 4.50c, Chicago base; another, 4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.30c, Portsmouth, O.; 5.65c, Sparrows Point, Md., Monessen, Pa.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J., 6.50c, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., Williamsport, Pa.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill, except: 4.90c, Sparrows Point, Md., 4.95c, Monessen, Pa.; 5.10c, Worcester, Mass.; 5.15c, Minnequa, Colo., Kokomo, Ind.; 5.20c, Atlanta; 5.75c, So. San Francisco, Pittsburg, Calif. One producer quotes 5.15c, Chicago and Pittsburgh base; another, 5.20c. Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md.; 5.40c, Monessen, Pa.; 5.55c, Worcester, Mass.; 5.60c, Kokomo, Ind., Minnequa, Colo.; 5.65c, Atlanta; 6.20c, Pittsburg, So. San Francisco, Calif. One producer quotes 5.60c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Column 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind.; 109 Worcester, Mass.; 110 Minnequa, Colo., Atlanta; 117, Portsmouth, O.; 123, Pittsburg, Calif.; 124, Cleveland; 126, Monessen, Pa.; $5.20 per 100 pound keg, Aliquippa, Pa.; $6.75, Conshohocken, Pa., Wheeling, W. Va. One producer quotes column 109, Chicago and Pittsburgh base; another, column 113, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive): Column 109, mill, except: 113 Monessen, Pa., Kokomo, Ind.; 116, Minnequa, Colo.; 121 Atlanta; 132, Pittsburg, Calif. One producer quotes column 113, Pittsburgh and Chicago base; another, column 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Barbed Wire: Column 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind.; 126 Atlanta; 128 Monessen, Pa.; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 145, So. San Francisco. One producer quotes 127, Chicago and Pittsburgh base.

Fence Posts (with clamps): Column 114, Duluth; 115, Johnstown, Pa.; 116, Moline, Ill.; 122, Minnequa, Colo.; $123.50 per net ton, Williamsport, Pa.

Bale Ties (single loop): Column 106, mill, except: 108, Sparrows Point, Md., Kokomo, Ind.; 110, Atlanta; 113 Minnequa, Colo.; 130, So. San Francisco, Pittsburg, Calif. One producer quotes column 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Tubular Goods

Standard Steel Pipe: Mill prices in carlots, threaded and coupled, to consumers about $200 a net ton.

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅜	41½	12½	1¼	46½–49	24–32
¼	39½	14			
⅜	36	9	1½	47–49½	24½–32½
½	40½–43	16½–24½	2	47½–50	25–33
¾	43½–46	25½–28½	2½, 3	48–50½	25½–33½
1	46–48½	23½–31½	3½ & 4	44½	25

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	39½	20	38½	19	27–38½	7½–19
2½	42½–43½	23–24	41½	22	32½–41½	13–22
3	42½–43½	23–24	41½	22	35–41½	15½–22
3½ & 4	42½–46½	25–27	43½	24	38½–43½	19–24
5 & 6	42½–44½	23–25	43½	24	38½–43½	19–24
7					43½	23

Line Steel Pipe: Mill prices in carlots to consumers about $200 a net ton.

	Butt Weld			Butt Weld	
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	40½		1¼	47–48	28–29
¼	38½				
⅜	35		1½	47½–48½	28½–29½
½	41–42	20½–21½	2	48–49	29–30
¾	44–45	24½–25½	2½ & 3	48½–49½	29½–30½
1	46½–47½	27½–28½	3½ & 4	43½	

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	38½	19	37½	18	26–37½	6½–18
2½	41½–42½	23	40½	..	31½–40½	12–21
3	41½–42½	23	40½	..	34–40½	14½–21
3½-4	41½–45½	22–26	42½	..	37½–42½	18–23
5 & 6	41½–43½	22	42½	..	40½–44½	20–24
8	45½	..	44½	24	41½–43	21–22½
10	45	..	44	23	44	23½
12	44	..	44½	..	40½–43	20–22½

Standard Wrought Iron Pipe: Mill price in carlots, threaded and coupled, to consumers about $200 a net ton.

	Butt Weld		Lap Weld	
In.	Blk.	Gal.	Blk.	Gal.
⅜	+59½	+93	1¼–2	+22	+50½
½	+20½	+50	2½–3½	+15½	+43
¾	+10½	+39	4	+ 7½	+34
1 and 1¼	+ 4½	+30	4½–8	List	+23½
1½	— 1½	+26½	9–12	+12	+34½
2	— 2	+26			

Boiler Tubes: Net base c.l. prices, dollars per 100', mill; minimum wall thickness, cut lengths 4 to 24"; inclusive.

		Seamless		Elec. Weld	
O.D. In.	B.W. Ga.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Drawn
1	13	....	13.39	13.00	13.00
1¼	13	....	15.87	13.21	15.39
1½	13	$15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	13	21.37	25.16	20.73	24.40
2¼	12	23.54	27.70	22.83	26.88
2½	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78
4½	9	58.99	69.42	....	....
5	9	68.28	80.35	....	....
6	7	104.82	123.33	....	....

Rails, Supplies

Rails: Standard, over 60-lb; $3.20 per 100 lb, mill.

Light (billet): $3.55-$4.25 per 100 lb, mill.

Light (rail steel): $4.70 per 100 lb., Williamsport, Pa.

Railroad Supplies: Track bolts, treated: $8.50 per 100 lb., mill. Untreated: $8.25, mill.

Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Calif.; 4.50c, Seattle.

Splice Bars: 4.25c, mill.

Standard Spikes: 5.35c, mill, except: 5.25c, Pittsburgh.

Axles: 5.20c, mill.

Bolts, Nuts

Prices to consumers, f.o.b. midwestern plants. Sellers reserve right to meet competitors' prices, if lower. Additional discounts on carriage and machine bolts, 5 for carloads; 15 for full containers, except tire and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	35 off
⅝ and ⅝ x 6-in. and shorter	37 off
¾-in. and larger x 6-in. and shorter	34 off
All diameters longer than 6-in.	30 off
Tire bolts	25 off
Plow bolts	47 off
Lag bolts, 6 in. and shorter	37 off
Lag bolts, longer than 6 in.	35 off

Stove Bolts

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller	41 off	....
½-in. and smaller	....	38 off
½-in.-1-in.	39 off	....
⅛-in.-1-in.	....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in. and larger	34 off	28 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	46 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	40 off
¾, ⅞, & 1 x 6 and shorter	35 off

Square Head Set Screws

Upset 1-in. and smaller	51 off
Headless, ¼-in. and larger	31 off

Rivets

F.o.b. midwestern plants

Structural ½-in. and larger	6.75c
7/16-in. and under	48 off

Washers, Wrought

Fob shipping point, to jobbers.....50c-$2 off

Tool Steels

Tool Steel: Cents per pound, producing plants; reg. carbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot work, 29.00c.

W	Cr	V	Mo	Co	Base Per lb
18	4	1	...	...	90.50c
18	4	2	...	...	102.5c
18	4	3	...	...	114.5c
18	4	2	...	9	168.5c
1.5	4	1	8.5	...	65.00c
6.4	4.5	1.9	5	...	69.50c
6	4	3	6	...	88.00c

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace	$48.00	$48.50	$49.00	$49.50
Newark, N. J., del.	50.39	50.89	51.39	51.89
Brooklyn, N. Y., del.	....	52.40	52.90	....
Philadelphia, del.	50.17	50.67	51.17	51.67
Birmingham, furnace	42.88	43.38	....	....
Cincinnati, del.	....	49.09	....	....
Buffalo, furnace	*44.00	*44.00	*44.50	45.00
Boston, del.	52.42	52.42	52.92	....
Rochester, del.	46.22	46.22	46.72	47.22
Syracuse, del.	47.025	47.025	47.525	48.025
Chicago, furnace	42.50-46.00	43.00-46.50	43.50-46.50	47.00
Milwaukee, del.	44.22-47.72	44.72-48.22	45.22-48.22	48.72
Muskegon, Mich., del.	....	47.98-51.48	48.48-51.48	....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.17	48.67	48.67	49.17
Duluth, furnace	45.50	46.00	46.50	47.00
Erie, Pa., furnace	45.50	46.00	46.50	47.00
Everett, Mass., furnace	....	48.75	49.25	....
Geneva, Utah, furnace	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	53.63	....	....
Portland, Oreg., del.	....	53.63	....	....
Los Angeles, San Francisco.	53.13	53.63	....	....
Granite City, Ill., furnace....	47.90	48.40	48.90	....
St. Louis, del.	48.65	49.15	49.65	....
Ironton, Utah, furnace	....	46.50	....	....
‡**Neville Island, Pa.,** furnace.	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	46.00	46.50	46.50	47.00
Sharpsville, Pa., furnace	46.00	46.50	46.50	47.00
Steelton, Pa., furnace	48.00	48.50	49.00	49.50
Struthers, O., furnace	42.50	....	....	....
Swedeland, Pa., furnace	50.00	50.50	51.00	....
Toledo, O., furnace	42.50	43.00	43.50	44.00
Cincinnati, del.	47.05	47.55	....	....
Youngstown, O., furnace	46.00	46.50	46.50	47.00
Mansfield, O., del.	49.87	50.37	50.37	50.87

* Republic Steel Corp. quotes $4 a ton higher for basic, No. 2 foundry and malleable at Buffalo.

‡ To Neville island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaco; $1.73 Verona; $1.94 Brackenridge; $1.08 to Ambridge and Aliquippa.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base)	$56.50		
6.51-7.00	57.75	9.01- 9.50	64.00
7.01-7.50	59.00	9.51-10.00	65.25
7.51-8.00	60.25	10.01-10.50	66.50
8.01-8.50	61.50	10.51-11.00	67.75
8.51-9.00	62.75	11.01-11.50	69.00

Fob Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron Si 14.01-14.50%, $81.75 furnace, Niagara Falls; $81 open-hearth and $82 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn. .....$66 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., Troy, N. Y., $54. Philadelphia, $56.81 delivered.

Intermediate phosphorus, Central furnace, Cleveland, $51.

Differentials

Prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more $37; less than 60% $34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace .	$13.50-15.50
Connellsville, foundry .	16.00-18.00
New River, foundry ..	16.50
Wise county, foundry.,	15.35
Wise county, furnace..	14.60

Oven Foundry Coke

Kearney, N. J., ovens.	$21.50
Chicago, ovens	20.40
Terre Haute, ovens....	21.00
Milwaukee, ovens	21.15
New England, del. ...	22.75
Birmingham, del.	18.66
Indianapolis, ovens ...	20.85
Cincinnati, del.	21.40
Ironton, O., ovens	18.25
Erie, Pa., del.	22.45
Painesville, O., ovens..	20.90
Cleveland, del.	22.45
Buffalo, del.	23.10
Detroit, del.	21.65
Philadelphia, ovens ...	20.55
Swedeland, Pa., ovens.	20.50
Portsmouth, O., ovens.	19.25

Coal Chemicals

Spot, cents per gallon, ovens

(Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree	20.50-26.50
Toluol, two degrees ...	23.00-26.50
Industrial xylol	20.50-26.50

Per pound, ovens

Phenol, 40 (car lots, returnable drums)	13.00
Do., less than carlots	13.75
Do., tank cars	12.00
Naphthalene flakes, balls, bbl to jobbers, "household use"	12.00

Per ton, bulk, ovens

Sulphate of ammonia .	$45.00

Refractories

(Prices per 1000 brick, fob plant)

Fire Clay Brick

Super Duty: St. Louis Vandalia, or Farber, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., $100.

High-Heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, or Vandalia, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, Haldeman, or Athens, Ky., Troup, Tex., Stevens Pottery, Ga., or Portsmouth, O., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Pa., Bessemer, Ala., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa.; Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.; $52, Goose Lake, Ill.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., $83; Beach Creek, Pa., $73.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa. $85; Joliet or Rockdale, Ill., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Chrome brick or chemical-bonded chrome brick, $69, magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices per net ton, fob works, Chewelah, Wash.)

Domestic dead-burned, ⅝" grains: Bulk, $31; single paper bags, $35.50.

Dolomite

(Base prices per net ton)

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibonsburg, Woodville, O., $11.85; Thornton, McCook, Ill., $11.95; Dolly Siding, Bonne Terre, Mo., $12.05.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural) Lower Lake Ports

(Any increase or decrease in R. R. freight rates, dock handling charges and taxes thereon effective after Apr. 1, 1948, are for buyer's account.)

Old range bessemer	$6.60
Old range nonbessemer	6.45
Mesabi bessemer	6.35
Mesabi nonbessemer	6.20
High phosphorus	6.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

Swedish basic, 60 to 68% ...	14.50
Brazil iron ore, 68-69%	18.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26–$28

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 67.60c-72.60c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio .....$25.50-$26.00	
45% no ratio	26.50
48% no ratio 29.00-30.00	
50% no ratio 29.50-30.50	
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
Rhodesian	
45% no ratio .....$27-$27.50	
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo., cont., Mines	$0.75

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS			STRIP		BARS				PLATES	
	H-R 10 Ga.	C-R 17 Ga.	Gal. *10 Ga.	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½" & up	H-R Alloy **4140	Standard Structural Shapes	Carbon ⅜"-¾"	Floor ¼" & Thicker
Boston (city)	5.84	6.64	7.84	6.04	6.90	5.69	6.39	8.24-9.74	5.54	5.89	7.34
Boston (c'try)	5.69	6.49	7.69	5.89	6.75	5.54	6.24	8.09-9.59	5.39	5.74	7.19
New York (city)	5.73-5.80	6.73	7.74-7.83	6.08-6.28	...	5.83	6.58	8.22	5.52-5.78	5.98	7.48
New York (c'try)	5.53-5.60	6.53	7.54-7.63	5.88-6.08	...	5.63	6.38	...	5.32-5.58	5.78	7.28
Phila. (city)	5.50-5.86	6.61-6.81	7.42-7.62	5.46-5.81	...	5.57-5.65	6.31	7.94	5.24-5.40	5.52-5.65	6.73-7.16
Phila. (c'try)	5.35-5.71	6.46-6.66	7.27-7.47	5.31-5.66	...	5.42-5.50	6.16	7.79	5.09-5.25	5.37-5.50	6.58-7.01
Balt. (city)	5.43†	6.33	7.13	5.49	...	5.54	...	...	5.48	5.68	7.13
Balt. (c'try)	5.28†	6.18	6.98	5.34	...	5.39	...	...	5.33	5.53	6.98
Norfolk, Va.	5.75	...	...	...	...	6.00	7.00	...	6.00	6.00	7.50
Wash. (w'house)	5.81	...	...	5.87	...	5.92	...	...	5.86	6.06	7.51
Buffalo (del.)	5.20-5.25	5.95-6.00	7.75	5.70	6.50	5.35	6.05	9.50	5.25	5.60	7.70
Buff. (w'house)	5.05-5.10	5.80-5.85	7.60	5.55	6.35	5.20	5.90	9.40	5.10	5.45	7.55
Pitts. (w'house)	4.85-5.00§	5.75-5.85[8]	7.00-7.05	5.00-5.35	5.95-6.00	4.90-5.10	5.65	7.65	4.90-5.15	5.05-5.25	6.55
Det. (w'house)	5.40§	6.30	7.60	5.40	...	5.45	6.17	8.12	5.45	5.65	7.10
Cleveland (del.)	5.13-5.29	6.00-6.29	7.34-7.49	5.17-5.69	6.85	5.30-5.34	6.05-6.10	7.94-8.29	5.34-5.60	5.50-5.54	6.95-6.99
Cleve. (w'hse)	4.98-5.75	5.75-6.14	7.19-7.85	5.02-5.54	6.70	5.15-5.19	5.90-5.95	7.79-8.14	5.19-5.45	5.35-5.39	6.80-6.84
Cincin. (w'hse)	5.26	6.11	7.60	5.52	6.07	5.52	6.07	...	5.37	5.61	6.91
Chicago (city)	5.20	5.90†[8]	7.20	5.00	6.30	5.05	5.85	7.80[9]	5.05	5.25	6.70
Chicago (w'hse)	5.05	5.75†[8]	7.05	4.85	6.15	4.90	5.70	7.65[9]	4.90	5.10	6.55
Milwaukee (city)	5.37	6.07†[8]	7.37	5.17	6.47	5.22	6.02	7.97[9]	5.22	5.42	6.87
St. Louis (del.)	5.34§	6.24[8]	7.44	5.34	6.64	5.39	6.19[12]	6.64	5.39	5.59	7.04
St. L. (w'hse)	5.19§	6.09[8]	7.29	5.19	6.49	5.24	6.04[12]	9.49	5.24	5.44	6.89
Birm'ham (city)	5.20§	...	6.60	5.20	...	5.15	6.66	...	5.15	5.40	7.41-7.66
Birm'ham (c'try)	5.05§	...	6.45	5.05	...	5.00	6.51	...	5.00	5.25	7.26-7.51
Omaha, Nebr.	6.07	...	9.33	6.07	...	6.12	6.92	...	6.12	6.32	7.77
Los Ang. (city)	6.55§	8.05	8.20†	6.75	9.50	6.20	8.00-8.50	...	6.70	6.40	8.15
Los Angeles (w'house)	6.40§	7.90	8.05†	6.60	9.35	6.05	7.85-8.35	...	6.55	6.25	8.00
San Francisco	5.95[21]	7.15	8.05	6.75[21]	8.25[15]	5.90[21]	7.55	10.20‡‡	5.90	7.60	8.10
Seattle-Tacoma	6.35[17]	7.90[5]	8.40	6.70[17]	...	6.20[17]	8.15[1]	9.45[2]	6.30[17]	6.35[17]	8.40[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 39,999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—400 to 14,999 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [15]—2000 lb and over; [17]—300 to 999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb; [23]—Price (but not other price in range) applies to any and all quantities.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § 18 gage and heavier; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $57, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn.) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $160 per gross ton of alloy, c.l., packed, $172; gross ton lots, packed, $187; less gross ton lots, packed, $204; fob Alloy, W. Va., Niagara Falls, N. Y.; or Welland, Ont. Base price; $165, Rockwood, Tenn.; $162, f.o.b. Birmingham and Johnstown, Pa., furnaces; $160, Sheridan, Pa.; $163, Aetna, Pa. Shipment from Pacific Coast warehouses on one seller add $31 to above prices, fob Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $201; less gross ton lots, $218 fob Chicago. Add or subtract $2 for each 1%, or fraction thereof, of contained manganese over 82% and under 78%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 26.0c, ton lot 27.1c, less ton 28.3c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload, 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.6c per lb of alloy, carload packed, 9.35c, ton lot 10.25c, less ton 11.25c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk 22.0c per lb. of contained Cr, c.l., packed 22.9c, ton lot 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.05% C 29.25c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

SILICON ALLOYS

20-30% Ferrosilicon: Contract, carload, lump, bulk, 16.50-17.50c per lb of contained Si; packed 18.90c; ton lots 20.00c, fob Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.5c per lb of contained Si, carload packed 12.1c, ton lot 13.55c, less ton 15.2c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.0c per lb of contained Si, carload packed 14.3c, ton lot 15.45c, less ton 16.7c. Delivered. Spot, add 0.3c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.) Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe.). C.l., lump, bulk, regular 19.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe).

Contract, basis fob Niagara Falls, N. Y., lump per lb cl 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c, smaller lots 8.65c; or, lump, carload, bulk, 8.40c per lb of alloy, packed c.l. 9.20c, ton lots 9.30c, 200 to 1000 lb 9.65c, less 200 lb 10.15c per lb of alloy. Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅝ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

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Advocates Moderate Metal Stocks

Los Angeles transit official advises conservatism because he believes further shortages or critical emergencies will precipitate drastic allocations and price control

New York — Inventories of nonferrous metals should be conservative, for any further shortages or critical emergencies will surely precipitate drastic allocations and price control, according to W. T. Reynolds, director, Purchases and Stores, Los Angeles Transit Lines. This observation was presented at the third annual Pacific Inter-Mountain Purchasing Agent's conference in Los Angeles recently.

It was pointed out that the supply and demand ratio of copper is closely balanced, production currently being at a rate of about 1 million tons annually and consumption at about 1,400,000 tons annually. "If these rates or ratio are sustained, the annual deficiency of roughly one-half million tons in domestic supply must be covered by imports to that extent," Mr. Reynolds said. "A recent check conducted by the industry revealed that refined stocks were about two to three weeks' supply, and refined stocks on fabricated inventories were about one-third of the fabricated unfilled sales. This is an exceedingly close operating margin.

"Legislation for metal mining subsidies . . . failed to materialize . . . and now is delayed until next year, but it is doubtful if the production from subsidized marginal operations would have halted any of the recent price increases in nonferrous metals. However, the lack of any program has resulted in the loss of much needed additional production."

World production of copper amounts to about 1,847,000 tons a year, of which the United States requires about 1,400,000 tons and Great Britain 400,000 tons, leaving practically nothing for other copper consuming countries, he said. The European Recovery Program, our government stockpiling program and any rearmament program which may be projected tend to increase the shortage.

"Undoubtedly the European Recovery Program will tend to increase the demand for copper abroad," Mr. Reynolds continued, "thus making it unlikely that any surplus will be available. ECA Administrator Hoffman estimates that from Apr. 1, 1948, to June 30, 1949, the net export of copper from the western hemisphere to the countries participating in ERP will be as follows: From the United States, 67,100 tons; from Canada, 82,600 tons; from western hemisphere countries, 233,700 tons; or a total of 383,400 tons.

In reviewing some of the fundamentals of the Marshall Plan, he mentioned the provision that participating nations must make available to the United States reasonable quantities of strategic materials, the provision that at least 5 per cent of each special local currency fund must be available for the purchase of such commodities, and the provision that the Strategic Materials Division is charged with promoting and increase in the production of such strategic materials in Marshall Plan countries.

Stockpiling—"It is generally conceded," Mr. Reynolds said, "that there is little, if any, copper in the stockpile to date. How much to put in the copper stockpile has been the subject of much discussion. Nongovernment sources have suggested 1 million tons. Another advises the equivalent of three years' wartime imports, some 1,800,000 tons. Representative Engel of Michigan . . . advocated an 11-year emergency coverage of some 6,700,000 tons. Even this last estimate was increased some 50 per cent in making provision for loss of South American imports, but taking the lowest estimate of 1 million tons, such procurement over the next three years could cause a race for the available supply with the usual chaos of a distorted price structure . . . The (Munitions Board's plan for accelerated stockpiling) is for prospective manufacturers and users of stockpile items to procure the government a certain percentage in excess of their normal supply. These excess purchases are to be transferred to the government stockpile, a method which it is hoped will eliminate industry and government bidding against one another in foreign markets.

Rearmament—"Any active rearmament program will demand a greatly accelerated consumption of copper, and brass mills have a direct interest in advocating that part of the copper stockpiled will be in shapes needed for their production . . . In an emergency, the brass mill industry would be immediately converted to the production of war essentials and we must not overlook the fact that in such an emergency the nonferrous industry stocks are a reserve, even though normally they are not subject to direct government control. Some 180,000 tons of copper were retrieved through the Copper Recovery Corp. for government use from stocks in distributors' and users' hands during the recent war.

Zinc—"It was anticipated that 1948 production of zinc, including secondary material, would be about 900,000 tons against a consumption of some 700,000 tons, with the government stockpiling in order to enable the brass mill industry to supply brass products for munitions and other war material in an emergency.

"As the supply of steel increases, it is expected the demand for zinc for galvanizing purposes will increase and production of rolled zinc and zinc die castings will accentuate the demand also. It is to be expected that from time-to-time the government will release from the stockpile sufficient zinc to enable mills to keep in operation since a stockpile loses much of its value, if mills have to shut down for lack of materials and then be suddenly reopened in a national emergency. Valuable time getting into peak of production is lost this way.

Tin—"Opinion prevails that world production of tin will not be in balance with consumption for at least 18 months. Some improvement has been made despite disturbances in Malaya, one of the tin producing countries. Of the 27,000 tons exported from Malaya during the first seven months of this year, more than one-half was distributed to the United States. The export tax on tin ore shipped from Malaya was abolished as of last June, and may open the way for the United States to acquire Malayan concentrates for treatment at the Texas City smelter. Tin allocations controls have been extended by Congress until June 30, 1949, and recently the Reconstruction Finance Corp. was authorized to continue operating the Texas City smelter until June 30, 1951.

"Stock of pig tin (exclusive of ore) held by RFC increased some 50 per cent since January, 1948, and the stockpile now probably stands at approximately 40,000 tons."

British Metal Prices Rise

New York — British Ministry of Supply has advanced the official maximum selling prices of copper, lead, zinc and aluminum in the home market, effective as of Oct. 1, as follows with U. S. currency equivalents of the quotations in parenthesis: Copper, to £140 (25.15c) from £132 (23.72c); lead, to £112 (20.12c) from £90 (16.17c); zinc, to £92 (16.53c) from £75 (13.48c); aluminum, to £87 (15.63c) from £80 (14.38c).

There was no effect on prices in the American markets last week as a result of this action. These adjustments merely brought British prices up to, or a little above, what are recognized as being the going levels on the world market.

Silver Prices Rise Further

New York — Due to continued active demand from domestic consumers, silver prices continued to advance steadily last week, reaching 76.50c toward the close of the week compared with 75.75c on Sept. 28. Demand from silverware manufacturers is particularly good because they have stepped up operations in preparation for requirements of the coming holiday season.

Magnesium Shipments Rise

Washington — Shipments of magnesium wrought products during August totaled 497,000 pounds, more than double the July shipments of 212,000 pounds, according to the Bureau of Census. Shipments in August of last year totaled 253,000 pounds. The August shipments brought the total for the first eight months of this year to 3,386,000 pounds, compared with 3,717,000 pounds in the corresponding period of last year.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic, 23.50c, Conn. Valley; Lake, 23.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 22.00c; 88-10-2 (No. 215) 31.00c; 80-10-10 (No. 305) 27.25c; No. 1 yellow (No. 405) 17.50c.

Zinc: Prime western 15.00c, brass special 15.25c, intermediate 15.50c, East St. Louis; high grade 16.00c, delivered.

Lead: Common 19.30-19.35c, chemical and corroding 19.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 16.00-17.00c, pigs 15.00-16.00c. Base prices for 10,000 lb and over, fob shipping point, freight allowed.

Secondary Aluminum: Piston alloy (No. 122 type) 25.00-23.75c; No. 12 foundry alloy (No. 2 grade) 22.00-23.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.50-24.00c; grade 2, 22.50-23.50c; grade 3, 22.00-22.50c; grade 4, 21.00-22.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, fob Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 35.00; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 35.50c, fob Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; shot nom.; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $75-$77 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $1.90, del.; special or patented shapes, $2.

Cobalt: 97-98%, $1.65 per lb for 550 lb (keg); $1.67 per lb for 100 lb (case); $1.72 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 77.25c per ounce.

Platinum: $93-$96 per ounce.

Palladium: $24 per troy ounce.

Iridium: $110-$115 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, fob mill)

Sheet: Copper 37.18; yellow brass 33.75; commercial bronze, 95%, 37.11; 90%, 36.63; red brass, 85%, 35.64; 80%, 35.16; best quality, 34.63; nickel silver, 18%, 46.41; phosphor-bronze, grade A, 5%, 56.05.

Rods: Copper, hot rolled 33.03; cold drawn 34.28; yellow brass, free cutting, 33.44; commercial bronze, 95% 36.80; 90% 36.32; red brass, 85% 35.33; 80% 34.85.

Seamless Tubing: Copper 37.22; yellow brass 36.76; commercial bronze 90% 39.29; red brass 85% 38.55; 80% 38.07.

Wire: Yellow brass 34.04; commercial bronze, 95% 37.40; 90% 36.92; red brass, 85% 35.93, 80% 35.45; best quality brass 34.92.

Copper Wire: Bare, soft, fob eastern mills, c.l. 29.42½c, l.c.l 29.92½-30.05c; weather-proof, fob eastern mills, c.l. 29.60-29.85c, l.c.l. 30.35c; magnet, delivered, c.l. 32.75-33.50c, 15,000 lb or more 33.00-33.75c, l.c.l. 33.50-34.25c.

ALUMINUM

Sheets and Circles: 2c and 3c mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	25.9	...	...
0.135-0.096	12-48	26.4	...	...
0.095-0.077	12-48	26.9	25.0	28.6
0.076-0.068	12-48	27.5	25.2	28.8
0.067-0.061	12-48	27.5	25.2	28.8
0.060-0.048	12-48	27.7	25.4	29.1
0.047-0.043	12-48	28.1	25.6	29.4
0.042-0.038	12-48	28.1	25.6	29.4
0.037-0.030	12-48	28.5	26.0	29.9
0.029-0.024	12-48	28.9	26.3	30.3
0.023-0.019	12-36	29.5	26.7	30.8
0.018-0.017	12-36	30.1	27.3	31.6
0.016-0.015	12-36	30.8	27.9	32.5
0.014	12-24	31.7	28.7	33.6
0.013-0.012	12-24	32.6	29.4	34.5
0.011	12-24	33.6	30.3	35.7
0.010-0.0095	12-24	34.6	31.3	37.0
0.009-0.0085	12-20	35.8	32.4	38.5
0.008-0.0075	12-20	37.1	33.6	40.1
0.007	12-18	38.5	34.9	41.9
0.006	12-18	40.0	36.2	46.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T	17S-T	—Hexagonal— R317-T	17S-T
0.125	45.0	47.0	...	...
0.156-0.203	38.5	40.0	...	...
0.219-0.313	35.5	37.0	...	...
0.344	34.0	36.00	...	...
0.375	33.0	35.5	42.5	43.0
0.406	33.0	35.5	...	...
0.438	33.0	35.5	42.5	43.0
0.469	33.0	35.5	...	...
0.500	33.0	35.5	42.5	43.0
0.531	33.0	35.5	...	...
0.563	33.0	35.5	40.5	40.5
0.594	33.0	34.5	...	...
0.625	33.0	35.5	40.5	40.5
0.656	33.0	35.5	...	...
0.688	33.0	35.5	40.5	40.5
0.750-1.000	32.0	34.5	37.0	38.0
1.063	32.0	34.5	35.5	36.5
1.125-1.500	31.0	33.5	35.5	36.5
1.563	31.0	33.5	...	35.5
1.625	30.0	32.5	34.5	35.5
1.688-2.000	30.0	32.5	...	...
2.125-2.500	29.5	31.5	...	...
2.625-3.375	28.5	30.5	...	...

LEAD

(Prices to jobbers, fob Cleveland, Pittsburgh)

Sheets: Full rolls, 140 sq ft or more, $23.25 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft; $1.25, less than 10 sq ft; $1, circles and segments. Pipe: Full coils, $22.50 per cwt; cut coils, $22.75. Traps and Bends: List price plus 70%.

ZINC

Sheets, 19.50-20.00c, fob mill, 36.00 lb and over. Ribbon zinc in coils, 18.25c-19.00c, fob mill, 36,000 lb and over. Plates, not over 12-in., 17.25c; over 12-in., 18.25c.

NICKEL

(Base prices, fob mill.)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, fob mill.)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb., 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9%, flake, fob Philadelphia, carloads, 26.00c; 5 tons and over 26.50c; 1 to 5 tons, 27.00c; less than 1 ton, 27.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 33.84c; oval 33.34c; electrodeposited, 31.09c; cast, 30.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 46.00c, fob Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 16.00c; 1000 to 19,900 lb, 15.00c, fob Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, fob Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; fob Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 26.50c; 275-lb, or 500-lb bbl, 24.50c, fob Cleveland.

Tin Anodes: Bar, 1000 lb and over 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 200 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c fob Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 800 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 39.25c, fob Cleveland; 39.00c, Detroit; 38.00c, fob Philadelphia.

Stannous Sulphate: Less than 2000 lb, in 100 lb kegs, 100.00c, in 400 lb bbl. 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 23.50c, Conn., for copper)

Prices in cents per pound for less than 15,000 lb fob shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.125	21.125	20.375
Yellow brass	18.000	17.750	17.125
Commercial Bronze			
95%	20.125	19.875	19.375
90%	19.750	19.500	19.000
Red brass			
85%	19.750	19.500	19.000
80%	19.500	19.250	18.750
Best Quality (71-79%)	19.000	18.750	18.250
Muntz Metal	17.250	17.000	16.500
Nickel, silver, 10%	19.625	19.375	9.813
Phos. bronze, A.	22.625	22.375	21.375
Naval brass	17.750	17.500	17.000
Manganese bronze	17.750	17.500	16.875

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 19.25, No. 2 copper 18.25, light copper 17.25, composition red brass 16.00, auto radiators 13.25, heavy yellow brass 11.50, brass pipe, 12.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 20.00-20.25, No. 2 copper 19.00-19.25, light copper 18.00-18.25, refinery brass (60% copper), per dry copper content 18.25.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 17.50-18.00, No. 2 16.50-17.00, light copper 15.50-15.75, No. 1 composition red brass 13.75-14.00, No. 1 composition turnings 13.25-13.50, mixed brass turnings 8.00-8.25, new brass clippings 13.00-14.00, No. 1 brass rod turnings 10.50-11.00, light brass 7.50-8.00, heavy yellow brass 9.75-10.00, new brass rod ends 11.00-11.50, auto radiators, unsweated 11.50-12.00, cocks and faucets 11.25-11.75, brass pipe 11.00-11.50.

Lead: Heavy 17.50-18.00, battery plates 11.75, linotype and stereotype 18.00-18.50, electrotype 16.50-17.00, mixed babbitt 15.75-16.25, solder joints, 19.75-20.25.

Zinc: Old zinc 7.75-8.25, new die cast scrap 7.50-8.00, old die cast scrap 4.50-5.00.

Tin: No. 1 pewter 65.00-67.00, block tin pipe 83.00-84.00, No. 1 babbitt 51.00-54.00, siphon tops 50.00-52.00.

Aluminum: Clippings 2S 12.00-12.50, old sheets 9.00-9.50, crankcase 9.00-9.50, borings and turnings 5.50-6.00, pistons, free of struts, 9.00-9.50.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Sept. Avg.	23.500	19.325	15.000	103.000	16.500	35.000	40.000	75.284
Aug. Avg.	23.230	19.325	15.000	103.00	16.269	35.000	40.000	73.790
Sept. 28	23.50	19.30–19.350	15.000	103.00	16.00–17.000	35.000	40.000	75.750
Sept. 29	23.50	19.30–19.350	15.000	103.00	16.00–17.000	35.000	40.000	76.250
Sept. 30	23.50	19.30–19.350	15.000	103.00	16.00–17.000	35.000	40.000	76.500
Oct. 1	23.50	19.30–19.350	15.000	103.00	16.00–17.000	35.000	40.000	76.500
Oct. 4	23.50	19.30–19.350	15.000	103.00	16.00–17.000	35.000	40.000	77.000
Oct. 5	23.50	19.30–19.350	15.000	103.00	16.00–17.000	35.000	40.000	77.250
Oct. 6-7	23.50	19.30–19.350	15.000	103.00	16.00–17.000	35.000	40.000	77.500

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00*
No. 1 Busheling	42.50-43.00*
Nos. 1, 2 Bundles	42.50-43.00
No. 3 Bundles	40.50-41.00
Machine Shop Turnings	37.50-38.00
Mixed Borings, Turnings	37.50-38.00
Short Shovel Turnings.	39.50-40.00
Cast Iron Borings	39.50-40.00
Bar Crops and Plate	49.00-49.50
Low Phos. Steel	49.50-50.00
Heavy Turnings	39.50-40.00

Cast Iron Grades

No. 1 Cupola	65.00-66.00
Machinery Cast	72.00-73.00
Charging Box Cast	59.00-60.00
Heavy Breakable Cast.	57.00-58.00
Malleable	69.00-70.00
Brake Shoe	57.50-58.00
Clean Auto Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.50-44.00
R.R. Malleable	75.00-80.00
Axles	55.00-56.00
Rails, Rerolling	58.00-59.00
Rails, Random Lengths	54.00-56.00
Rails, 3 ft and under	61.00-62.00
Rails, 18 in and under	62.00-63.00
Railroad Specialties	61.60†
Uncut Tires	54.50-55.00
Angles, Splice Bars	53.00-54.00

*Plus applicable freight springboard. †Nominal, last dealer buying price.

CLEVELAND

No. 1 Heavy Melt. Steel	$42.00-42.50*
No. 2 Heavy Melt. Steel	42.00-42.50*
No. 1 Busheling	42.00-42.50*
Nos. 1 & 2 Bundles	42.00-42.50*
Machine Shop Turnings	37.00-37.50
Mixed Borings, Turnings	36.50-38.50
Short Shovel Turnings.	38.00-38.50
Cast Iron Borings	38.00-38.50
Bar Crops and Plate	47.00-47.50
Punchings & Plate Scrap	47.00-47.50
Heavy Turnings	42.00-43.00
Alloy Free Turnings	40.00-41.00
Cut Structurals	48.50-51.50

Cast Iron Grades

No. 1 Cupola	69.00-71.00
Charging Box Cast	58.00-60.00
Stove Plate	58.00-60.00
Heavy Breakable Cast.	54.00-56.00
Unstripped Motor Blocks	58.00-60.00
Malleable	78.00-80.00
Brake Shoes	52.00-53.00
Clean Auto Cast	71.00-73.00
No. 1 Wheels	58.00-60.00
Burnt Cast	56.00-57.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*
R.R. Malleable	80.00-82.00
Rails, Rerolling	60.00-66.00
Rails, Random Lengths	60.00-63.00
Rails, 3 ft and under	63.00-66.00
Cast Steel	57.00-59.00
Railroad Specialties	60.00-62.00
Uncut Tires	57.00-58.00
Angles, Splice Bars	61.00-63.00

* Plus applicable freight springboard on earmarked material.

VALLEY

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00
No. 1 Bundles	42.50-43.00
Machine Shop Turnings	37.00-39.00
Short Shovel Turnings.	39.00-39.50
Cast Iron Borings	38.50-39.00
Low Phos.	48.50-50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*

* Plus applicable freight springboard.

MANSFIELD

Machine Shop Turnings	$37.50-38.00
Short Shovel Turnings.	39.50-40.00

CINCINNATI

No. 1 Heavy Melt. Steel	$42.00
No. 2 Heavy Melt. Steel	42.00
No. 1 Busheling	42.00
Nos. 1 & 2 Bundles	42.00
Machine Shop Turnings	36.00
Mixed Borings, Turnings	36.00
Short Shovel Turnings.	38.00
Cast Iron Borings	37.00

Cast Iron Grades

No. 1 Cupola Cast	63.00
Charging Box Cast	53.00
Heavy Breakable Cast.	59.00
Stove Plate	55.00
Unstripped Motor Blocks	56.00
Brake Shoes	50.00
Clean Auto Cast	63.00
Drop Broken Cast	71.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00
R.R. Malleable	75.00
Rails, Rerolling	62.00
Rails, Random Lengths	58.00
Rails, 18 in. and under	63.00

DETROIT

(Brokers' buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$37.50-38.00
No. 1 Busheling	37.50-38.00
Nos. 1 & 2 Bundles	37.50-38.00
No. 3 Bundles	37.50-38.00
Machine Shop Turnings	31.50-32.00
Mixed Borings, Turnings	31.50-32.00
Short Shovel Turnings.	32.50-33.00
Cast Iron Borings	32.50-33.00
Punchings & Plate Scrap	42.50-43.00

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast.	54.00-59.00
Clean Auto Cast	60.00-65.00

BUFFALO

No. 1 Heavy Melt. Steel	$48.00-48.50
No. 2 Heavy Melt. Steel	41.75-42.25
No. 1 Busheling	41.75-42.25
No. 1 & 2 Bundles	41.75-42.25
Machine Shop Turnings	36.75-37.25
Mixed Borings, Turnings	36.75-37.25
Cast Iron Borings	37.75-38.25
Short Shovel Turnings.	38.75-39.25
Low Phos.	49.00-50.00

Cast Iron Grades

Mixed Cupola	65.50-66.50
No. 1 Cupola	68.00-69.00
Heavy Breakable Cast.	55.00-57.00
Malleable	70.00-75.00
Clean Auto Cast	62.00-64.00

Railroad Scrap

Rails, 3 ft. and under.	61.00-62.00
Railroad Specialties	60.00-61.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$45.00-45.50
No. 2 Heavy Melt. Steel	41.50
No. 1 Busheling	41.50
Nos. 1 & 2 Bundles	41.50
No. 3 Bundles	39.50
Machine Shop Turnings	37.50
Mixed Borings, Turnings	37.50
Short Shovel Turnings.	38.50
Bar Crop and Plate	50.00-51.00
Punchings & Plate Scrap	50.00-51.00
Cut Structurals	50.00-51.00
Elec. Furnace Bundles.	47.00-48.00
Heavy Turnings	45.50-46.50
No. 1 Chemical Borings	46.00-46.50

Cast Iron Grades

No. 1 Cupola Cast	63.00-65.00
No. 1 Machinery Cast.	67.00-68.00
Charging Box Cast	64.00-65.00
Heavy Breakable Cast.	62.00-63.00
Unstripped Motor Blocks	59.50
Malleable	76.00-78.00
Clean Auto Cast	64.00-65.00
No. 1 Wheels	68.00-70.00

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$39.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	35.00
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings.	30.00-31.50
Punchings & Plate Scrap	42.00-42.50
Cut Structurals	42.00-42.50
Elec. Furnace Bundles.	42.00-42.50

Cast Iron Grades

No. 1 Cupola Cast	57.00-58.00
Charging Box Cast	57.00-58.00
Heavy Breakable	58.00
Unstripped Motor Blocks	53.50-54.50
Malleable	68.00-69.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$38.90
No. 2 Heavy Melt. Steel	34.40
No. 1 Bundles	34.40
No. 1 Busheling	34.40
Machine Shop Turnings	29.90
Mixed Borings, Turnings	29.90
Short Shovel Turnings.	31.90
Bar Crops and Plate	40.00-41.00
Punchings & Plate Scrap	40.00-41.00
Chemical Borings	37.00-38.00

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast.	60.00-62.00
Stove Plate	54.00-55.00
Unstripped Motor Blocks	50.00-52.00
Clean Auto Cast	54.00-56.00

CHICAGO

No. 1 Heavy Melt. Steel	$41.50-42.00
No. 2 Heavy Melt. Steel	41.50-42.00
No. 1 Bundles	41.50-42.00
No. 2 Bundles	41.50-42.00
No. 3 Bundles	39.50-40.00
Machine Shop Turnings	36.50-37.00
Mixed Borings, Turnings	36.50-37.00
Short Shovel Turnings.	38.50-39.00
Cast Iron Borings	37.50-38.00
Bar Crops and Plate	47.00-48.00
Punchings	48.00-49.00
Elec. Furnace Bundles.	42.50-43.00
Heavy Turnings	41.00-41.50
Cut Structurals	46.50-47.00

Cast Iron Grades

No. 1 Cupola Cast	70.00-71.00
Clean Auto Cast	70.00-71.00
No. 1 Wheels	61.00-63.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	45.00-46.00
Malleable	81.00-82.00
Rails, Rerolling	64.00-65.00
Rails, Random Lengths	57.00-58.00
Rails, 3 ft and under	61.00-62.00
Rails, 18 in. and under	62.00-63.00
Railroad Specialties	55.50-56.50
Angles, Splice Bars	56.50-57.50

ST. LOUIS

No. 1 Heavy Melt. Steel	$44.00-45.00
No. 2 Heavy Melt. Steel	40.00-41.00
Machine Shop Turnings	35.00-36.00
Short Shovel Turnings.	36.50-37.50

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	65.00-66.00
Mixed Cast	56.00-58.00
Heavy Breakable Cast.	59.00-60.00
Brake Shoes	60.00-61.00
Clean Auto Cast	65.00-67.00
Burnt Cast	59.00-60.00

Railroad Scrap

R. R. Malleable	71.00-72.00
Rails, Rerolling	63.00-65.00
Rails, Random Lengths	56.00-59.00
Rails, 3 ft and under	60.00-61.00
Uncut Tires	51.00-52.00
Angles, Splice Bars	54.00-56.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
Nos. 1 & 2 Bundles	39.00
No. 3 Bundles	37.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	40.00
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	63.00
Stove Plate	60.00-62.00
No. 1 Wheels	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	nom.
Axles, Steel	50.00
Rails, Rerolling	53.00-55.00
Rails, Random Lengths	45.00-48.00
Rails, 3 ft and under	53.00-55.00
Angles and Splice Bars	52.00-53.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*27.50
No. 2 Heavy Melt Steel	*27.50
No. 1 Busheling	*27.50
Nos. 1 & 2 Bundles	*27.50
No. 3 Bundles	*24.50
Machine Shop Turnings	*18.00
Bar Crops and Plate	*27.50
Cast Steel	*27.50
Alloy Free Turnings	*18.00
Cut Structurals	*27.50

Railroad Scrap

No. 1 Heavy Melting	*28.50
Axles	*34.00
Rails, Random Lengths	*29.00

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$27.50
No. 2 Heavy Melt. Steel	27.50
No. 1 Busheling	27.50
Nos. 1 & 2 Bundles	27.50
No. 3 Bundles	24.50
Machine Shop Turnings	21.00-22.50
Mixed Borings, Turnings	21.00-22.50
Punchings & Plate Scrap	35.00
Cut Structurals	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	45.00
Heavy Breakable Cast.	35.00
Stove Plate	30.00
Unstripped Motor Blocks	32.50
Malleable	40.00
Brake Shoes	35.00
Clean Auto Cast	40.00
No. 1 Wheels	37.50-40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.50
Railroad Malleable	30.00
Rails, Random Lengths	30.00-32.00
Angles and Splice Bars	28.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$27.50
No. 2 Heavy Melt. Steel	27.50
Nos. 1 & 2 Bundles	27.50
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles.	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melt.	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	28.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	42.00-48.00
No. 2 Cast	35.00-37.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

Sheets, Strip . . .

Pressure for flat-rolled stock continues with only stainless competitive in distribution

Sheet Prices, Page 138

Boston—Among flat-rolled products stainless is one of the few grades still classified as competitive in distribution. Confusion in prices and extras, beginning with hot-rolled, is not contributing to stability. Consumers are increasingly cognizant of this situation with some shifting of orders to lower cost volume.

There is talk of full pipe lines on additional light consumer goods, but no easing for steel at mill level where cancellations are rare. There is some slackening and weeding out among job stamping shops mostly war-grown branches, but established stampers are still short of sheets and strip.

New York — Only in stainless steel and other specialties are sheet consumers able to find any "free" tonnage for shipment over the remainder of the year, short of the gray market. Consumer quotas for the last quarter have been set up, except by a very few mills and even in these cases the pattern is pretty clearly defined, with allotments for the first two months established and tentative distribution for the third and last months indicated. Apart from certified buyers, consumers will receive less new tonnage than in the third quarter, although with production stepping up they may not fare too badly from the standpoint of overall tonnage, including arrearages and new bookings. However, they will receive far less than they would like to obtain, and the outlook for the first quarter is even less promising.

Pittsburgh — Most sellers have established a 10 per cent across-the-board reduction in monthly mill allotments for all sheet classifications through remainder of this year. Similar reduction has tentatively been set up for January shipments, although schedules will not be fixed until a more accurate estimate of yearend carryover tonnage can be determined. Modernization programs being carried out on hot and cold-rolled sheet and strip facilities have retarded full scale operations among companies affected. This situation has substantially offset added theoretical capacity through installation of some new facilities. Scheduled increase in shipments to metalworking companies coming within scope of voluntary allocation programs is considered a major factor in continued tightness in flat-rolled steel supply for bulk of consumers. Some producers have been forced, under these programs, to take on new customers.

Cincinnati — Sheet mills in this district hope to work off carryover this month, which was especially heavy in cold-rolled, to begin on fourth quarter allotments. Pressure for tonnage was never greater and all facilities are engaged in an effort to increase deliveries. Schedules have not been disrupted because they were set up to include tonnage on the preference list. Further cuts in quotas, now under previous quarters this year, may be avoided. Demand in all grades of sheets shows no easing.

Chicago — Complaints against the allocation system are increasing as flat-rolled supply tightens. Consumers are fearful that the gap between supply and demand this quarter will be the largest since the end of the war, and some manufacturers are planning to reduce output in some lines to stretch their steel stocks to cover others. A district household appliances manufacturer, for example, is reported to be scaling back its range output in favor of refrigerators. An upswing in gray market activity undoubtedly will accompany any further restrictions on available sheet and strip supply to nonpreferential industries.

Birmingham — Production of both sheets and strip is currently on a reasonably full schedule, but mills are not making much progress toward catching up with current and carryover demand. Varying dates are heard as to completion of the cold reduction mill at Fairfield, but nothing official. Most sheet users, however, expect but scant aid in that direction since backlogs are reported as exceptionally heavy.

Molybdenum Prices To Rise

New York—Climax Molybdenum Co. has announced a general increase in prices of its molybdenum products, effective on all deliveries after Jan. 1. The increases will range from 15 to 20 per cent, except 8 per cent on anhydrous sodium molybdate and 33⅓ per cent, on molybdenum silicide.

The following table shows the present and Jan. 1, 1949, prices per pound of molybdenum contained, f.o.b. Langeloth, Pa., excepting molybdenite concentrate which is f.o.b. Langeloth or Climax, Colo.:

	Present	For Shipment After Jan. 1, 1949
Molybdic Oxide	$0.80	$0.95
Molybdic Oxide, Technical	0.80	0.95
Molybdic Oxide, Briquettes	0.80	0.95
Calcium Molybdate	0.80	0.96
Molybdic Oxide, Pure	0.95	1.10
Ferromolybdenum	0.95	1.10
Molybdenite Concentrate	0.75	0.90
Nickel-Molybdenum	1.50	1.75
Molybdenum Silicide	0.60	0.80
Sodium Molybdate, Anhydrous	0.50	0.54
Cobalt-Molybdenum	1.60	1.85
Ammonium Molybdate, Pure	...	0.90

Issues Rosslyn Metal Price List

Carnegie, Pa. — The first published price list for the new Rosslyn metal, the cladmetal which has a copper core bonded permanently to stainless steel surfaces, has been issued by the American Cladmetals Co.

The base prices apply to various grades and range from 78.00c to 94.00c per pound. Sizes of standard production sheets were also made known. In length, they range from 3 to 180 inches and in width from 3 to 54 inches. The minimum thickness is 25/1,000-inch while the maximum is 1/5-inch. The heaviest single piece weighs 500 pounds. Special sizes outside the standard sheets are quoted on application.

Company's prices are based f.o.b. Carnegie, Pa., mill, and are as follows: Type 302, 78 cents; type 304, 81 cents; types 305 and 308, 84 cents; type 347, 94 cents. Under quantity extras, 40,000 to 99,999 pounds is considered base; while for quantities under 40,000 pounds the extras range from 3 cents to $2.50 per pound, and for 100,000 pounds and over, there is a discount of 2 cents per pound.

Plates . . .

Plate Prices, Page 139

New York — Only consumers with certified requirements are receiving anywhere near the amount of plates thy need, and even most of these buyers would like to have considerably more tonnage than they are getting. Noncertified consumers report supply as being the tightest they have ever experienced in peacetime and see little improvement ahead for some months. Some are turning more to the gray market than heretofore, but not in sufficient numbers to force prices up to the high levels still being offered for sheets. On 3/16-inch material one offering of a carload was heard recently of 11 cents a pound. This was getting near the sheet range in the gray market, and, as a matter of fact, the plate offered for sale was near the sheet range in specification, as well. However, no actual sale was reported and, in general, the gray market on plates is holding around 7 to 8 cents, as compared with 11 to 14 cents on carbon sheets, with most sales going at 12 cents and higher.

Substantially higher premiums in the gray market for sheets, compared with plates, which are almost as equally scarce, is ascribed in no small measure to the fact that in most manufactured products requiring sheets, the cost of steel is relatively small compared with other factors; whereas in plates, cost of steel is much more important. Thus, consumers of sheets can, if necessary, afford to pay a higher price for steel than consumers of plates. Another factor is the greater scrap loss in the fabrication of plates.

Boston—After allocated tonnage is accounted for, plus oil industry volume, plate supply is steadily contracting for the average fabricating shop. Shipyard requirements are heavier, but probably will not reach peak before January. Navy got four bids recently on 109 tons of floor plates from two mills and two jobbers, but none quoted on the entire lot. On 220 tons of hull plate steel, two mills quoted, one with premium prices.

Philadelphia — While further discussions were held in Washington last week with respect to additional voluntary allocation programs, plate producers believe that whatever may develop will not affect fourth-quarter schedules. Even as the situation now stands, certified work will take more than one-third of available supply of plates in the current quarter and the mills have schedules filled to the limit.

Birmingham — Stringency in plates continues. Considerable portion of this shortage is laid to voluntary allocation programs, but it is likely that diversion to steel pipe is taking more tonnage than had been anticipated. Tank and car producers are also using sizable amounts.

Seattle — Plate fabricators are seriously handicapped by the increasing shortage of materials and no relief is in sight. Contract figures are restricted to the quantity of plates in inventory or immediately available.

Steel Bars . . .

Bar Prices, Page 138

Boston—Assuming hot-rolled stock is available, several cold-drawn carbon bar producers hope to make progress against delinquent tonnage by the end of this quarter. This is more likely to be the case with integrated units than with nonintegrated suppliers. Producers are in some instances channeling higher ratio of hot carbon bars to their own cold finishing mills. Upward trend in alloy demand continues and shortage of hot-rolled alloys for cold drawing now parallels that prevailing in carbon. There is a sharp increase in inquiry for bearings for aircraft. There are scattered about some sizable bar inventories among consumers, including forge shops, but in most cases there is lack of balance. There may be sizable lots of steel on consumer racks in some cases, but tonnage generally includes an accumulation of volume currently moving into production slowly.

New York — Although carbon bars are not in as pressing demand as the other major products, particularly sheets, plates and pipe, supply continues short of demand, with consumers looking for little improvement before spring and with question then as to whether there will be any real semblance of a balanced supply and demand. However, stringency in the current quarter should not be much, if any, greater than in the last quarter. Preference requirements should be only a little heavier, because the freight car program requirements, which represent the bulk of bar tonnage under special allocation, will hold about unchanged. There was not much change in the volume of arrearages at the end of the third quarter, as compared with three months previously and, while more hot tonnage is being diverted to cold drawn material, bar production should be a little heavier than in the third quarter.

Philadelphia — Bar demand continues highly diversified, with requirements still in excess of supply. New tonnage involved in fourth-quarter consumer quotas is lighter than that set up for the third quarter. However, the situation is not as stringent as in pipe and the flat products, notably sheets and plates.

Wire . . .

Wire Prices, Page 139

Birmingham — Some easier trends are noted in finished wire in some instances with a considerable slackening in demand anticipated from agricultural circles with Fall weather in sight. However, such items as most sizes of nails and wire fencing are still virtually unobtainable, especially in satisfactory quantities for retail trade.

Memphis, Tenn. — Pennsylvania Wire Rope Co. appears low on 4500 tons steel wire strand for the district engineer, Memphis, at 9.60c, Williamsport, Pa.; six bid for the tonnage. Allegheny Ludlum Steel Corp., Pittsburgh, is low on 456,000 squares noncorrosive reinforcing fabric at $4.74 per square; this inquiry brought out two bids.

Structural Shapes . . .

Structural Shape Prices, Page 139

Boston—Structural fabricators are still off balance as to late fourth-quarter quotas. Larger shops are filled with deliveries five to six months away while uncertainty over plain material hampers those depending on small tonnage contracts for earlier delivery. New inquiry is up for estimates in less volume, but is still coming out up to the level of plain material available. Heaviest buyer of fabricated structural steel continues to be Stone & Webster Engineering Corp., placing most contracts here and in New York. Most of this tonnage is for work outside this district, including 7000 tons recently for power plants.

Philadelphia — Activity in the structural steel market here is still spotty with the leading award involving 2500 tons for an addition to the Sunbury electric station of the Pennsylvania Power & Light Co., Philadelphia, placed with Bethlehem Steel Co. New inquiry is comprised chiefly of public projects. Fabricators, however, are booked up over the remainder of the year and throughout the greater portion of the first quarter. Their particular difficulty is in maintaining a rounded supply of steel.

Seattle — Fabricating plants continue normal operations despite shortages of steel. There is a fair run of small jobs, but larger contracts are sidestepped because materials are unavailable in normal tonnages. Mills indicate that allocations will be lower in the last quarter. The situation is aggravated by the delay in shipments by water, making it necessary to accept mill deliveries by rail at increased freight costs. The water tieup is delaying completion of jobs.

Largest tonnage pending is the Washington state Agate Pass bridge, involving 1415 tons shapes and 300 tons steel piling, low bids being $1,398,439, under engineer's estimate, by Manson Construction & Engineering Co., Seattle. The award will not be made for 60 days as this project is tied in with the proposed purchase by the state of the Puget Sound ferry system, at an agreed price of $5,975,000. In the meantime it is expected to arrange the necessary bond issue.

Tubular Goods . . .

Tubular Goods Prices, Page 139

St. Louis — Pressure for pipe by consumer goods manufacturers is increasing in direct ratio to the mounting allocation of it for defense purposes—barges, railroad cars, atomic energy projects and the like. Pipemakers' schedules are filled through the first quarter, even though they have accepted none but emergency orders for months. They believe a formal opening of the books would fill overnight their rolling capacity for a year. Heaviest demand is for 1-2, 3/4 and 1-inch diameters.

Seattle — Interest in cast iron pipe is stagnant due to the inability of mills to make deliveries in reasonable time, although the potential market in this area is of major proportions. No projects of size are pending.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 138

Seattle — Rolling mills are more concerned with speeding deliveries of reinforcing bars on current orders than in booking new business. Pressure is insistent for both small and major tonnages and little headway is being made against backlogs. Bids to Bureau of Reclamation for the Soap Lake siphon, Columbia Basin project, have been postponed from Oct. 19 to Nov. 2.

Budd High Bidder on Plant

Philadelphia — Budd Co., this city, is high bidder at approximately $5 million for the government-owned Red Lion plant at nearby Bustleton. Budd has been leasing the property since the end of the war for the mass production of stainless steel cars.

Furnace Has New Operator

Buffalo — Contract under which Republic Steel Corp. operated a Tonawanda, N. Y., blast furnace of Colorado Fuel & Iron Corp.'s Wickwire Buffalo Division was terminated Oct. 1.

Known as "Y" furnace, it is one of two stacks at C. F. & I.'s properties at Tonawanda. The other stack, "X," was put back into operation in August by C. F. & I. The "X" stack, which Republic had operated since about 1939, had been idle since the end of the war.. However, "Y" furnace had continuously been operated by Republic since about 1935.

In taking over operation of "Y" furnace, it was disclosed by C. F. & I. that it has developed new and enlarged sources of iron ore and coke sufficient to operate both of its Tonawanda furnaces.

Between them the two companies intend to supply customers with an aggregate tonnage of merchant pig iron equal to that recently supplied such customers by Republic. C. F. & I. is shipping iron to consumers on an individual price basis but expects to establish a price schedule this week.

Iron Ore . . .

Iron Ore Prices, Page 140

Cleveland — Shipments of Lake Superior iron ore from the upper lake ports declined 86,043 tons during September to 10,598,735 tons from 10,684,778 tons in September, 1947, according to the Lake Superior Iron Ore Association.

Shipments during September, 1948, and the like month a year ago were, respectively, as follows in tons: Escanaba, 605,333 and 473,568; Marquette, 436,868 and 632,321; Ashland, 648,412 and 736,030; Superior, 3,875,194 and 3,322,146; Duluth, 2,455,695 and 2,938,695; Two Harbors, 2,381,894 and 2,347,128; total United States ports, 10,403,396 and 10,449,888; Michipicoten, 64,879 and 46,284; Port Arthur, 130,460 and 188,606; total Canadian ports, 195,339 and 234,890.

The cumulative total for the season to Oct. 1 was 65,168,440 tons, or an increase of 5.62 per cent or 3,468,883 tons over the 61,699,561 tons for the like period a year ago.

Pig Iron . . .

Several sellers raise prices $2.50 to $3 a ton; charcoal iron advances $4

Pig Iron Prices, Page 140

Pittsburgh — Carnegie - Illinois Steel Corp. advanced merchant pig iron prices at Pittsburgh and Chicago $3 a ton for all grades, effective as of Oct. 1. Company also advanced standard ferromanganese $15 per ton to $163, Aetna, Pa., effective same date, while spiegeleisen was increased $10 to $66, Pittsburgh and Chicago.

Merchant pig iron price advance by Carnegie puts its prices in line with those quoted by other merchant interest in this area and is said to reflect steady increase in operating costs over recent months.

Tennessee Products Corp. advanced charcoal pig iron prices $4 per ton to $66, f.o.b. furnace, Lyles, Tenn., effective Oct. 1.

Foundry interests report further squeeze on profits as result of continued increase in wage and raw material costs. Gray iron foundries raised wages in September, and followed with a 6 to 10 per cent increase in castings prices to offset this and other increased operating costs. Most gray iron foundry interests state competition growing keener and further reduction in order backlogs is noted. Some interests state high operating costs have forced them to price themselves out of certain markets, primarily involving welded stampings.

Geneva Steel Co. also advanced prices $3 a ton on basic and No. 2 foundry pig iron to $46 and $46.50, respectively at Geneva, Utah, and to $46.50 on No. 2 foundry at Ironton.

Shenango Furnace Co., Pittsburgh, will advance all grades of pig iron $3 per gross ton, effective Oct. 11, at its Sharpsville, Pa., furnace.

Boston — Considering critical shortage of iron in recent months, foundry closings have been surprisingly few and curtailments in schedules are below expectations. Fill-in requirements are met through foreign iron purchases, but acute supply situations in some cases have been eased by decline in melts resulting in lower volume of orders. High ratio of scrap in melts contributes toward iron savings, but new business in numerous shops is lower. Users of basic are somewhat better supplied, but will operate through winter on a close margin.

New York — Low phosphorus pig iron has been advanced $4 a ton at Troy, N. Y., to $54, furnace. This follows a similar advance recently by another eastern producer—an advance that was applied by this latter seller to all major grades.

A little easing is noted in the car situation, with one leading Buffalo iron producer, for instance, now reporting supply of gondolas as being in balance with tonnage for shipment for the first time in fully a month.

Imports continue to relieve the stringency in iron in some measure, with September arrivals along the eastern seaboard likely to be the heaviest so far this year, according to some trade observers. Prices are too high to attract widespread in-

terest in foreign iron; nevertheless, there is a growing market.

Philadelphia — Pig iron shipments to the merchant trade are moving a little more freely, especially to foundries. The Swedeland, Pa., producer is stepping up his deliveries of foundry iron sharply and a little improvement is noted in other producing quarters. Following the recent $4 advance at Bethlehem and Steelton, no further changes are expected to be made by district producers for the time being.

Cleveland — Merchant pig iron prices were advanced $3 a ton Oct. 4 at American Steel & Wire Co.'s Central furnaces here. This increase makes basic iron $46, foundry and malleable $46.50, bessemer $47, and intermediate phosphorus $51. Republic Steel Corp. followed Steel & Wire's move and increased its prices here $3 to the same levels. Republic raised low phosphorus iron $4 at Troy, N. Y., making the new price $54, effective Sept. 29.

Foundry demand for iron continues far in excess of supply, with a result that foreign iron is being relied upon increasingly to prevent production halts. Iron is being made available here from Holland, Belgium, Luxemburg, Germany, France, Austria and Sweden. Lowest prices reported were $84 to $85 per ton at seaboard. Other prices are said to range up to $99.50 at seaboard. Rail rate from seaboard to Cleveland adds $9.66. Swedish charcoal iron is reported priced at $125 a ton at seaboard.

Foreign iron is available in standard analyses, and the buyer can specify the analysis he desires. Furthermore, the buyer can specify the tonnage and delivery dates from Europe. One seller reports that because of the increasing amounts of foreign iron coming to the United States, the minimum for an order is now 100 tons instead of 500. Four to five weeks are required for delivery of an order.

Youngstown—Youngstown Sheet & Tube Co. has increased pig iron prices $3 a ton, effective as of Oct. 4. Prices now are $46 a ton for basic, $46.50 for malleable and No. 2 foundry iron.

Cincinnati — Deliveries of pig iron are lagging considerably behind promised delivery dates, in some instances by a month. Furnace quotas to consumers in this district have not been altered in recent months, but foundries are without stocks and the melt must be adjusted to receipts of iron. In general, demand for castings is sustained as the light melt prevents depletion of backlogs.

Chicago — In the wake of recent eastern pig iron price increases two district producers advanced their prices $3 a ton, but by midweek other area producers had not followed suit. No relief is in sight yet for the tight iron situation, although there are reports that some foundries are actively soliciting business. Explanation of this apparent paradox lies in withdrawal of some automotive business from the area in favor of captive or more conveniently located foundries. Opinion in the area is that foundry business could fall off quite substantially without affecting demand for iron because of the current low percentage of pig in the melt, one estimate being that only about

10 per cent of the melt at present is iron.

Weirton, W. Va. — Weirton Steel Co. has blown out its 1100-ton No. 3 blast furnace for relining, a task that will take about 40 days. The furnace has been operating since December, 1941, producing 2,854,556 net tons of pig iron without repairs or relining. Company enlarged its No. 2 blast furnace early in 1947 and its No. 1 furnace in 1946.

Birmingham — Momentary notice of advance in pig iron prices in the South is generally expected, although the largest merchant melters said this week no real consideration had been given anticipated boosts, even after announcement of such action came from elsewhere.

Seattle — Government allocations have aggravated the tight pig iron supply. Only small tonnages are being received by local foundries, who report business in general has declined.

Lone Star Furnace Blown In

Lone Star, Tex. — Lone Star Steel Co.'s giant blast furnace is back in production after a shutdown for the addition of expanded slag facilities and the installation of the latest type carbon block bottom, E. B. Germany, president, announced last week.

Carbon blocks, a recent development in furnace linings, make the Lone Star furnace as efficient as any in the country. Already, production of foundry iron has exceeded 88 per cent of the plant's rated capacity which is 970 gross tons per day.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 140

Pittsburgh — Very little oven foundry coke is available to foundres in this area and outlook is not bright for months ahead. Basic steel producers report inability to produce adequate tonnage of oven foundry coke for own operations and therefore have been forced to buy Connellsville beehive coke. Some oven foundry coke is still shipped here from Daingerfield, Tex. Foundry operations have not been retarded significantly by lack of coke, although inferior beehive coke quality has restricted output somewhat. Most foundries are more concerned over critical scarcity of pig iron and inability to obtain good quality cast scrap at reasonable prices. Price range on Connellsville beehive furnace coke continues at $13.50 to $15.50 per net ton. However, some sellers report it more difficult to obtain the higher price in recent weeks. Connellsville beehive foundry coke is $16 to $18 per net ton.

Cleveland — Demand for oven foundry coke continues strong, despite a supply increase and a decline in consumption in some foundries where orders for castings have fallen off. Helping sustain orders for oven coke is the demand from consumers who have had to rely on beehive coke while the oven product was not available in sufficient quantities. Quality of oven coke is reported improved. Prices are unchanged.

Birmingham — Alabama By-Products Corp. increased foundry oven coke prices 80 cents a ton, effective Oct. 6, to the basis of $18.66 a ton.

Scrap . . .

Foreign receipts ease seaboard supply situation, but inland users await report on quality

Scrap Prices, Page 144

Boston — Largest melters of cast scrap are better inventoried and buying is less active. Consumers are reluctant to pay recent top prices and balk more frequently with offers of $4 to $5 below former purchases. Premiums are less evident in steel trades, more buying being at formula, although higher prices for select lots of No. 1 melting steel have not entirely disappeared. One steelworks is meeting scrap needs nearly 100 per cent through ship-breaking with its own crews.

New York — Brokers' buying prices for steel scrap are unchanged. Due to unusually favorable weather conditions in recent weeks, domestic scrap has been coming out rather freely and added to this has been steady improvement in the arrival of foreign scrap. This situation has resulted in a slightly easier undertone, but so far no drop in offering prices. Consumers have been taking in all good scrap offered and, as a matter of fact, are in a fairly comfortable position for the present, although not for the long pull.

Cast grades are unchanged, except for heavy breakable which is slightly higher at $58, f.o.b. New York shipping point.

Philadelphia — Steel scrap prices are steady, with consumers taking all of the tonnage offered, but not pressing for still more. Meanwhile foreign shipments continue to arrive, the latest cargo involving German scrap for distribution among two or three of the smaller independents. The market undertone in cast scrap is easy, although no change in prices is noted.

Buffalo — The prolonged stalemate in the scrap market here appeared on the verge of breaking late last week, as a sale was indicated to one of the largest mills in the district. While there were rumblings in dealers' circles that new business would be placed above the present formula, there were no inklings of such price action among mills. Dealers, however, insist it is impossible to accept additional orders at the prevailing price of $42.25 a ton for No. 2 heavy melting when dealers are paying above this price to cover old commitments.

Three more barges arrived last week from the seaboard with about 3000 tons of war scrap aboard.

Pittsburgh — Growing selective purchasing policy among consumers indicates scrap inventories are in fair shape. Current high price levels continue to stimulate collection and segregation of scrap, while mills report heavy influx of scrap from customers. Future price trend is expected to be largely dependent on how much consumers' inventories can be augmented by early winter months. While there appears to be less pressure for higher scrap prices, quotations of past few weeks remain unchanged. However, greater price resistance is noted on part of foundries for railroad specialties, due in part to exorbi-

tant prices of recent weeks and fact many foundries are in good shape in regard to scrap inventories at a time when a definite easing in demand for castings is developing. Railroad specialties on the New York Central and Erie Railroad lists were expected to bring around $59 last week, in contrast to last dealer purchase price of about $61.50.

Cincinnati — The iron and steel scrap market continued dull last week as mills and foundries hesitated to expand inventories despite the usual seasonal trend in that direction. At the same time, dealers noted a falling off in collections throughout some source areas. Such slowing of tonnage would mitigate against adequate supply if aggressive buying returns soon to the district market. Meanwhile, prices hold steady.

Chicago — Quiet which has prevailed in the scrap market for some time was accentuated last week as the result of religious holidays. The situation with respect to supply changes little from week to week with mills and foundries apparently receiving enough to support their current high level of operations and to augment ground stocks slightly in preparation for winter. Throughout the trade, belief is held that influx of quantities of German scrap will have little effect on American scrap prices, although every ton that is received will be welcomed. This material may be of relatively poor quality and, if spread over the entire country, will do very little to alleviate the present shortage. Cost of it when and if moved this far inland, even though delivered by ship to New Orleans, probably will not be significantly different from that of domestic material. A slightly easier tone in railroad specialty items has been developing over the past several weeks.

St. Louis — Trading in scrap was at a virtual standstill here last week during the Jewish holiday season. Business was limited to shipping old orders, few new ones being accepted. Prices are steady in both steel and cast grades, although a stronger tone in cast in the Birmingham area, if continued, is expected to reach this district shortly. Mill stocks are considerably above last year's at this time and melters are able to hold out against price increases even though eager to build for the winter months. Most users are getting their daily melt without trouble and occasionally there is an excess to add to inventories. If better cast prices at Birmingham begin to draw the metal from southeast Missouri and Arkansas, foundries here may soon be in difficulty, since curtailment of the main local pig iron source has increased their cast needs abnormally. There is some tentative shopping for foreign scrap going on, but no purchases have been reported. Some coming imports of steel scrap are said to have been offered here for Gulf port delivery at $45 a ton, which would hike cost at the furnace to $8 to $10 above the current domestic price. Consumers are skeptical of quality of the foreign metal and are unwilling to go to the expense of having an inspection made before shipment from abroad. The chances are none will be bought in this area until some of the big eastern mills have

reported their experience with it.

Birmingham — Renewed activity in scrap is reported this week, probably because of approaching cold weather and the rainy season which brokers and dealers say will further tighten the supply situation. Heavy melting continues to be quoted at $39.50, but tonnage moves regularly at from $1 to $2 above that quotation. Cast grades are especially in demand.

Los Angeles — So pressing is demand for scrap, the flow of material through the dealers' yards is sufficient to keep 1500 collectors in the Los Angeles area in business and enables many small collectors to carry on with a minimum of overhead. The market is firm at $27.50 for No. 1 heavy melting steel scrap.

The shortage of foundry cast iron scrap is about on a par with that of pig iron. Foundrymen are scraping the barrel, yet continue to operate with no shutdowns materializing, but with some rumored.

Such uncertainties as are mirrored in the scrap market are regarded as a good index of general conditions in the southern California steel industry. Summed up, it is that high prices and dearth of materials are now accepted as part and parcel of the business picture.

Rumors that a vast quantity of Alaskan scrap in the form of piled up machinery left there by the Army in wartime may be moved into the western market are no more than that at present. One Los Angeles buyer who visited Sitka recently reports that around 100,000 tons are available once a shortline rail line is built from tidewater to the interior where the machinery is stacked.

This same buyer discounts any program for moving Orient scrap into the west at a time within the foreseeable future.

At Los Angeles, ship breaking has come to a virtual standstill. A few vessels are left for scrapping in the San Francisco area and still others at Olympia, Wash. There is little hope, however, that any of this will reach market much before the first of next year.

Seattle — While receipts of steel scrap exceed current consumption slightly, inventories are not increasing as much as desired and mills are looking to the winter months with some anxiety, especially as present orders for steel items are testing mill capacity. The higher price level of $27.50 per gross ton for heavy melting has not stimulated country shipments as much as expected. Surplus ships are not available in the number hoped for and breaking plants are working on backlogs. The supply of vessels for breaking up probably will be exhausted by the end of the year.

The cast iron market has reached new price levels. Last month the foundry price was $42 and today it is up to $45 or better. A local foundry bid $46.25 for 100 tons of Navy scrap, but was outbid at $48 by a Portland buyer representing a California interest. Local buyers state that $66 is being paid in Los Angeles, $55 in San Francisco. Outside interests invading this area are blamed for the sudden advance in price. In some instances buyers are paying a premium by accepting material which is only partially prepared.

Warehouse . . .

Warehouse Prices, Page 141

Pittsburgh — Further reduction in steel distributors' inventories for such popular items as galvanized sheets, alloy bars, plates and structurals has been noted in recent weeks. Most distributors are pessimistic over the steel supply outlook through remaining months this year despite indicated record high level of steel mill operations. Chief cause for such concern are the increased steel mill allotments that are being channeled under voluntary allocation programs. Reduction in monthly mill quotas through fourth quarter has not been uniform product-wise.

Cincinnati — Steel jobbers are getting a reaction from the reductions in mill quotas, by way of an outpouring of inquiries originating in this district and outside normal sales territory. Warehouses are able to meet only part of this demand, stocks being depleted in the fastest-moving items. A fair shipment of sheets and angles, in which the shortage is critical, was recently received but was exhausted quickly.

Chicago — While not all distributors are alike in their degree of pessimism about the outlook for supply over the remainder of the year, the brightest hope any of them have is that their receipts will be the same as in last quarter. Tonnage received by warehouses moves directly from the warehouse floor against customers' orders, and the tightness has spread decisively in the last six months to include alloy and stainless as well as carbon grades. Aircraft and other defense demands are now being felt in volume.

Seattle — Jobbing houses report no change. Demand continues steady and volume of turnover is substantial in spite of shortages in major items. Gray market operators have cut into the jobbing trade in instances where contractors required materials which wholesalers were unable to supply. The plate situation is worse as coast mills cannot meet the demand and allocations from Geneva are reported suspended. No improvement is expected until the government eases restrictions.

Canada . . .

Toronto, Ont. — Production of pig iron in Canada for July amounted to 187,940 net tons for a daily average of 80.6 per cent of rated capacity and compares with 183,763 tons or 81.4 per cent daily average in June. In the month under review, output included 150,282 tons of basic iron of which 140,527 tons were for further use of producing firms and 9755 tons for sale; 22,525 tons of foundry iron with 1398 tons for further use and 21,127 tons for sale; and 15,133 tons of malleable iron, all for sale.

Production of ferroalloys in July amounted to 12,939 net tons.

Output of steel ingots and castings in July totaled 244,872 net tons for a daily average of 76 per cent against 259,365 tons in June when the daily average was 83.2 per cent.

Charges to steel furnaces in July included 142,661 tons of pig iron, 70,379 tons of scrap of consumers own make, and 59,315 tons of purchased scrap.

Freight Car Awards Drop

New York — Domestic freight car awards of 845 for September, were the lowest since June, 1945, when 670 cars were placed. The trend has been decidedly off for the past several weeks and has been attributed by car builders in part to increasing costs.

September awards compare with 3739 for August and 2230 for May, which until now was the lowest figure for the year. Of the 845 cars placed, according to American Railway Car Institute, 495 went to car builders and 350 to railroad shops. Total orders as of Oct. 1 amounted to 73,718 against 91,087 at the corresponding time of 1947. Order backlogs as of that date amounted to 108,907 cars as compared with 117,815 a month earlier and 115,996 a year ago.

September deliveries totaled 9753, bringing deliveries for the first nine months up to 84,150, an average of 9350, as compared with 41,476 during the same period last year. Of September deliveries, 6978 were from commercial shops and 2775 from railroad shops.

Steel Shipments Increase

SHIPMENTS of steel during August totaled 5,329,060 net tons, not including 591,317 tons sent to members of the steel industry for conversion into further finished products or for resale. July's shipments, excluding those to members of the industry, were 5,229,880 tons.

During the first eight months of the year, shipments exclusive of those to members of the industry totaled 42,776,975 net tons, according to the American Iron & Steel Institute. Shipped to members of the industry for further conversion or for resale were 4,468,687 tons. In the first eight months of 1947, shipments exclusive of those to members of the industry totaled 41,487,768 tons.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2500 tons, Sunbury station addition, Pennsylvania Power & Light Co., Philadelphia, to Bethlehem Steel Co.

640 tons, plant buildings, Cranston Paint Works Co., Fletcher, N. C., to Bethlehem Steel Co.; Potter & Shackelford Inc., Greensville, S. C., general contractor.

430 tons, two state bridges, Delaware county, Pennsylvania, to American Bridge Co., Pittsburgh.

325 tons, Regina Pacis church, Brooklyn, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

350 tons, law building, University of Tennessee, Knoxville, Tenn., to Southern Steel Works, Birmingham, Ala.; Foster & Creighton Co., Nashville, general contractor. Connors Steel Co., Birmingham, furnishing concrete reinforcing bars.

340 tons, bearing piles for Pennsylvania Turnpike extension near Harrisburg, to Bethlehem Steel Co.

100 tons, carborundum plant, Vancouver, Wash., to Pacific Car & Foundry Co., Seattle.

STRUCTURAL STEEL PENDING

1415 tons, Washington state Agate Pass bridge; Manson Construction & Engineering Co., Seattle, low $1,398,439; no award for 60 days pending financial negotiations.

930 tons, New Hampshire Turnpike, Seabrook-Portsmouth, N. H., including bridge structures, Savin Construction Co., East Hartford, Conn., low on general contract.

805 tons, bridge and approaches, Pennsylvania railroad and route 27, Woodbridge, N. J.; bids Oct. 28, state highway commissioner, Trenton.

350 tons, building, General Refractories Co., Philadelphia, for erection at Olive Hill, Ky.; bids closed Oct. 7.

180 tons, Lehigh Valley grade crossing, Manville, N. J.; bids asked.

150 tons, PMF sales and service station, Philadelphia; bids closed Oct. 6.

Unstated, six-story plant for Pacific Telephone & Telegraph Co., Portland, Oreg.; general contract to Robertson, Hay & Wallace.

REINFORCING BARS . . .

REINFORCING BARS PLACED

900 tons, continued treatment building, St. Elizabeth's hospital, Washington, D. C., to Bethlehem Steel Co.; Cramer-Vollmerhausen, Washington, general contractor. Atlas Machine & Iron Works, fabricates 60 tons, structural steel.

250 tons, plant buildings, Cranston Paint

Works Co., Fletcher, N. C., to Southern General Fireproof Co., Atlanta, Ga.; Potter & Shackelford Inc., Greenville, S. C., general contractor.

185 tons, Pennsylvania Turnpike extension near Harrisburg, to Bethlehem Steel Co.

154 tons, administration building, Illinois State normal school, Normal, Ill., to Bethlehem Steel Co.; John Felmley Sons Co., Bloomington, Ill., contractor.

125 tons, Kirkland, Wash., high school, to Bethlehem Pacific Coast Steel Corp., Seattle; Wick & Dahlgren, Seattle, general contract.

100 tons, state highway, Glastonbury-Middletown, Conn., to Truscon Steel Co., Youngstown; D. Arrigoni, Middletown, Conn., general contractor.

REINFORCING BARS PENDING

2500 tons, Cedar Bluff dam, Missouri Basin project, Smoky Hill river, near Ogallah, Kans.; bids to chief engineer, Bureau of Reclamation, Denver.

2400 tons, Bon Marche building, first unit Northgate shopping center, Seattle; H. S. Wright & Co., Seattle, low, $868,860; John Graham, Jr., Seattle, architect.

1400 tons, Veterans hospital, Seattle; Sound Construction & Engineering Co., Seattle, low, $6,267,711.

975 tons, dam and structures, canal, Central Valley project, near Patterson, Calif.; bids to chief engineer, Bureau of Reclamation, Denver.

630 tons, New Hampshire Turnpike, Seabrook-Portsmouth, Savin Construction Co., East Hartford, Conn., low on general contract; project also requires 210 tons, sheet and bearing piles.

600 tons, Veterans hospital, Miles City, Mont.; Lease & Leighland, Seattle, awarded general contract, $4,400,000.

410 tons, bars and trusses, bridge division, district government, Washington, D. C.; bids in.

400 tons, Washington state Agate Pass bridge; Manson Construction & Engineering Co., Seattle, low.

357 tons, Hinsdale Township high school, Hinsdale, Ill.; bids of July 30 over estimate, rejected.

227 tons, Merrimac office, Illinois Bell Telephone Co., Chicago; bids Oct. 4.

130 tons, bridge and approaches, Pennsylvania railroad and route 27, Woodbridge, N. J.; bids Oct. 26, state highway commissioner, Trenton.

Unstated, Gorge $1 million diversion dam, Skagit project; bids to Seattle Oct. 21.

Unstated, power plant, Fairbanks, Alaska, for Alaska Railroad; Morrison-Knudsen Co., Seattle, low, $816,705.

Unstated, $1,200,000 auditorium and music building; bids to University of Washington Board of Regents in mid-November.

Unstated, 8-story medical center, estimated at $340,000, Yakima, Wash.; bids to J. W. Maloney, architect, Oct. 12.

PLATES . . .

PLATES PENDING

300 tons steel sheet piling, Washington state Agate Pass bridge; bids in.

PIPE . . .

CAST IRON PIPE PENDING

135 tons, 4000 feet of 12-inch cast iron pipe for Leavenworth, Wash.; bids in also for alternatives.

RAILS, CARS . . .

RAILROAD CARS PENDING

Great Northern, 500 fifty-ton all-welded gondolas and 100 seventy-ton covered hopper cars, bids asked.

Pulista Railroad (Brazil), 1000 boxcars; bids asked.

Western Pacific, 250 seventy-ton gondolas; bids asked.

CONSTRUCTION AND ENTERPRISE

ALABAMA

BIRMINGHAM—Birmingham Gas Co. has awarded a $600,000 contract to Brice Building Co. for an operating and service center; Miller, Martin & Lewis, Title Guarantee Bldg., architects and engineers.

PLEASANT GROVE, ALA.—Town, J. R. Howard, mayor, is planning to build a $500,000 natural gas system; J. W. Goodwin Engineering Co. Inc., 726 South 29th St., Birmingham, engineer.

CALIFORNIA

HAYWARD, CALIF.—Atlas Imperial Diesel Engine Co., 1000 Nineteenth St., Oakland, is planning to erect a $1 million warehouse building and factory building and has started construction on a tank and batch house; Douglas McClellan & Associates, 816 W. Fifth St., Los Angeles, architects; Larsen & Larsen, 629 Bryant St., San Francisco, contractors.

LOS ANGELES—Tubular Steel Scaffolds Inc. has been formed by Howard E. Buckingham, Burbank; Richard W. Page, and Fred W. Lorenz, Los Angeles, with a capital of $200,000. The corporation is represented by F. Moldenhauer, 1801 Wilshire Blvd.

LOS ANGELES—Russell, Burdsall & Ward Bolt & Nut Co., 4466 Worth St., has awarded a $16,000 contract to California Steel & Construction Co., 3833 Medford St. for erection of a storage building at 4482 Worth St.

SAN DIEGO, CALIF.—Consolidated Vultee Aircraft Corp. has received a $5 million subcontract to build 167 nose fuselage sections for the Boeing B-50 four-engined heavy bomber.

INDIANA

BLOOMINGTON, IND.—Bloomington Packing Co., P. O. Box 7, is contemplating building a $110,000 addition to its packing plant; plans by Smith, Brubaker & Egan, 30 N. LaSalle St., Chicago.

KOKOMO, IND.—Delco Radio Div., General Motors Corp., Berry W. Cooper, manager, has awarded a $375,000 contract to A. J. Glaser, Lincoln Ave. and Big 4 Railway, Muncie, for a factory addition.

LOUISIANA

ASTRICIA, LA.—Gulf Refining Co., Pipe Line Div., Gulf Bldg., Houston, Tex. will build a $125,000 crude oil dock terminal by the Mississippi River.

MASSACHUSETTS

CAMBRIDGE, MASS.—M. E. Baker Co., 143 Sidney St., has awarded a $115,000 contract to Jefferson Construction Co. for a manufacturing plant.

FALL RIVER, MASS.—Firestone Rubber & Latex Div., F. L. Armitage, general manager, Firestone Ave., has awarded a $1 million contract to F. L. Collins & Son Inc., 408 Academy Bldg., for a factory addition, railroad siding and loading facilities.

MICHIGAN

DETROIT—Central Iron Foundry, 204 Orleans St., is planning to construct a $125,000 core room extension; Giffels & Vallet, 1000 Marquette Bldg., engineers and architects.

DETROIT—Production Steel Co., 4800 Beaufait St., has awarded a $280,000 contract to Barton-Malow Co., 2631 Woodward St., for construction of a warehouse and office; J. Leonard Rush, 8869 Piedmont St., architect.

MINNESOTA

ORTONVILLE, MINN.—Otter Tail Power Co., Fergus Falls, has awarded a $3 million con-

tract to J. F. Pritchard & Co., 908 Grand St., Kansas City, Mo., for a generating plant, turbine generator and accessories.

RED WING, MINN.—Northern States Power Co. of Wisconsin, A. E. Freeberg, district manager, has awarded an $800,000 contract to Hoeppner-Bartlett Co., 631 E. Madison St., Eau Claire, Wis., for construction of a generating plant; Pioneer Service & Eng. Co., 3123 N. Clark St., Chicago, engineer.

MISSOURI

ST. LOUIS—U. S. Atomic Energy Commission has awarded a $25,000 contract to Raymond Concrete Pile Co., New York, for piling for building and a $245,000 contract to George L. Cousins Contracting Co., St. Louis, for plant facilities building at 65 Destrehan St., Wedemeyer & Hacker, 111 N. Fourth St., architect.

OHIO

AKRON—McCoy Machinery Co. has been organized by E. S. Scheck, 430 Second National Bldg., agent; Lillian Olsen and V. R. McCoy, 296 Spicer Ave., to manufacture and deal in devices and supplies used in connection with trucks and road machinery.

CLEVELAND—Hine & Co. Inc., 1900 Euclid Bldg., has been incorporated by M. J. Hine, president, to export and import industrial products and some electrical appliances.

CLEVELAND—Thermoflux Products Inc. has been incorporated by Walter C. Kelsey, 3114 Corydon Rd., agent; Thomas F. Peterson, 23450 Laureldale Rd.; and Albert Bonds, 1256 Warren Rd., to deal in and manufacture metals and alloys, electrical and mechanical equipment.

CLEVELAND—B.M.S. Laundry Machine Co., Celia Brooks, 7000 Union Ave., has purchased a $30,000 building at 10516 Morrison Ave. for expansion purposes.

CLEVELAND—Van Dorn Iron Works, Joseph Reichel, sales manager, 2685 E. 79th St., has developed a new plastic press which makes a large variety of products ranging from novelties to major industrial parts.

CLEVELAND—Carnegie Body Co., 6115 Carnegie Ave. has awarded a $140,000 contract to Dunbar Co., 8201 Cedar Ave., for construction of a sales and service building at 3960 Carnegie Ave.

TOLEDO, O.—Lee & Cady, L. G. Kelly, manager Ohio Division, Washington St. has awarded a $1 million contract to George Lathrop & Sons Inc., 1510 Montcalm St., for a warehouse with loading docks and cold storage space on Laskey Rd.; David Levy, 70 E. 45th St., New York, architects.

OREGON

PORTLAND, OREG.—National Biscuit Co., 1129 N.W. Davis St., has awarded a $3 million contract to L. H. Hoffman, 715 S.W. Columbia St., for a biscuit factory on N.E. Columbia Blvd. and N.E. Vancouver Ave.

PENNSYLVANIA

DERRY, PA.—Westinghouse Electric Corp., Union Bank Bldg., Pittsburgh, has awarded a $200,000 contract to Dick Construction Co., 2532 Library Rd., Pittsburgh, for a manufacturing building.

LANCASTER, PA. — Armstrong Cork Co., Liberty & Mary Sts., has awarded a $1 million contract to John H. Wickersham Engineering & Construction Co. Inc., 14 S. Duke St., for a warehouse building addition to buildings 156B and 156C.

SOUTH CAROLINA

COLUMBIA, S. C.—Shakespeare Co., W. G. Balz, vice president, Kalamazoo, Mich., is going to construct a $350,000 plant near here at Alta Vista to increase production of its glass fishing rods; Austin Co., Cleveland, designer and constructor.

TENNESSEE

COLUMBIA, TENN.—Tennessee Valley Authority, E. R. Wall, manager, Central District, has construction underway on a proposed $1 million substation here and a $1,700,000 substation at Jackson.

TEXAS

HOUSTON, TEX.—Phillips Chemical Corp., City National Bank Bldg., has awarded a $7,500,000 contract to Chemical Construction Corp., Empire State Bldg., New York, for design and construction of a chemical plant at Todd-Houston Dry Dock grounds on Chocolate Bayou area.

TEXAS CITY, TEX.—Pan American Refinery Corp., Harold R. Snow, manager, has awarded a large contract to H. K. Ferguson Co., M & M Bldg., Houston, for alterations to its building, a laboratory addition, and construction of a pilot plant, office, and chemical laboratory building gate and change houses.

VICTORIA, TEX.—Barnsdall Oil Co. will build a $650,000 gas compressor plant.

WISCONSIN

PORT WASHINGTON, WIS.—Simplicity Mfg. Co., W. J. Niederkorn, president, producers of garden tractors and specially designed implements, will build a $250,000 addition to their plant to house general and executive offices and new machinery.

WAUWATOSA, WIS.—Western Metal Specialty Co., 1211 N. 62 St., has awarded a $150,000 contract to Peters Construction Co., 2640 N. Humboldt Ave., Milwaukee, for a factory addition; R. A. Messmer & Bro., 231 W. Wisconsin Ave., Milwaukee, architects.

PRICES OF LEADING FERROALLOYS PRODUCTS

(*Concluded from Page* 141)

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.00c per lb of briquet, c.l. packaged 10.80c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.0c per lb of briquet, c.l. packed 10.8c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 5.75c per lb of briquet, c.l. packed 6.55c, ton lot 7.35c, less ton 8.25c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 5.90c, c.l. packed 6.70c, ton lots 7.50c, less ton 8.40c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5 max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 3.25-4% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, fob Bridgeville, Pa. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.). Contract, ton lots, 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lot $1.28, less ton $1.35. Fob Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract, $160 per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21% C 3-4.5%). Contract, $175 per ton, fob Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si), $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.75 per lb of contained Cb, less ton $2.80. Delivered. Spot, add 10c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%; Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Carload, packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lot 17.25c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 42-46%, Ca 5%, Ti 9%). C.l. packed, 16.50-17.00c per lb of alloy; ton lots 17.90-18.00c; less ton lots 19.40-19.50c, fob Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%; V-7, Cr 28-32%, Si 15-21%, Mn 14-16%). C.l. packed, 14.25c per lb. of alloy; ton lots 15.75c; less ton lots 17.00c, fob Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 11c, ton lots 11.25c, smaller lots 11.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base): Gross tons per carload, fob sellers' works, Mt. Pleasant, or Siglo, Tenn.; $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c. Effective Jan. 1, 1949, price will be $1.10, Langeloth.